

EDITION 3

ADDENDUM #1

NEW PAGES

TO BE INSERTED INTO

PART I

OF

CHESTERFIELD COUNTY

WATER AND SEWER

SPECIFICATIONS

PLEASE THROW THIS SHEET AWAY WHEN INSERTING NEW PAGES INTO BOOK.

PART I

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For sewage flow depth less than 1/4 full, allowance should be made for increased value of "n". In no case should velocities of less than 1.3 feet per second be permitted. Increased velocities shall be accomplished by steeper grades.

5. The following are minimum slopes in feet per hundred feet to be provided for pipes flowing 1/4 of full depth to full depth:

Pipe Size	8"	10"	12"	15"	18"	21"	24"	27"	30"	36"
Slope %	.40	.32	.24	.20	.16	.12	.10	.08	.07	.06

A minimum slope of 0.520 shall be maintained for terminal 8" lines not likely to be extended.

Minimum pipe size between manholes shall be 8".

6. In cases where sewers are to be constructed on steep grades for which high velocities are indicated, the maximum permissible velocity at average flow (before applying peak flow factor) should not exceed 15 feet per second. Suitable drop manholes shall be provided to break the steep slopes and to limit velocities to not more than 15 feet per second in the connecting sewer pipes between manholes.

Where drop manholes are impracticable for reduction of high velocity, the sewer shall be of solid wall PVC pipe or other abrasion resistant material.

7. Miscellaneous head losses at manholes, curves and junctions shall be estimated and allowed for as follows:
 - a. At manholes on straight runs allow head loss = 0.05 feet.
 - b. 90° turns made inside of manholes, where the radius of turn is less than 2 pipe diameters allow $0.50 V^2/2g$. If the radius of turn is greater than 2 pipe diameters, allow $0.25 V^2/2g$. In no case should the total allowance be less than 0.05 ft.
 - c. At transitions and interjections of sewers larger than 24" in diameter, allow $0.50 V^2/2g$.
8. In general, the pipe diameter should be continually increasing with increase in tributary flow. Where steep ground slopes make possible the use of a reduced pipe size and substantial economy of construction costs is thereby indicated, the pipe size may be reduced but due hydraulic allowances shall be made to provide for head loss at entry, increased velocity and effect of velocity retardation at the lower end where the flow will be on flatter slopes. In no case, should pipe sizes be thus reduced more than one nominal size in diameter.

APPENDIX 1

DEVELOPERS CHECKLIST FOR UTILITY PROJECTS

The following steps must be completed before the County will permit the Utilities Contractor to start construction:

- _____ 1 - The developer may qualify for refunds where oversized lines are proposed. He should meet, as soon as possible, with the Department of Public Utilities to discuss his eligibility for refunds. One week prior to the meeting, the Developer shall submit a plat of the tract of land to be developed showing boundaries, title to the property and such other information required by the Department. Where refunds are involved, the developer must adhere to the current refund policy, copy of which is available upon request.
- _____ 2 - The Department has reviewed the utilities plan. (Initial review of the plan will normally be completed within 2 to 3 weeks of receipt provided the engineer has submitted all required information needed to perform a proper review.
- _____ 3 - The project plan has been approved by the appropriate agencies (i.e., County - erosion control, sewer, water, roads and drainage; Virginia Department of Transportation - roads and drainage; Virginia Department of Health and State Water Control Board) and written verification has been furnished to the Department of Public Utilities, where applicable.
- _____ 4 - The developer has sent a letter to the Development Section requesting the County to prepare a utilities contract. The letter needs to include the "Information Required For Utilities Contract" form and a copy of the "accepted" unit price bid proposal between the owner and the utilities contractor. Normally, the contract will be prepared within 2 days. The Board of Supervisors must approve contracts where refunds are involved. Two to three weeks should be allowed for this approval.
- ===== 5 - Both copies of the utilities contract have been executed and returned to the County.

- _____ 6 - All off-site and on-site easements, not included in a subdivision plat for the project, have been dedicated to the County. The Developer is to provide a check payable to the Clerk of the Circuit Court in the amount of the recordation costs when the executed easements are returned to the Right-of-Way Section. The Right-of-Way Section will calculate the charge and inform the Developer.
- _____ 7 - The Utilities Contractor has obtained the highway permit, if required, and sent a copy of the permit to the Department of Public Utilities, Construction Section.
- _____ 8 - For the onsite subdivision work, the erosion control measures have been installed and approved by the County Environmental Engineering Department. However, for the offsite utility work in conjunction with a subdivision, the field installation has been inspected by the Utility Inspector as approved by the County Environmental Engineering Department. Confirmation of approval should be obtained by the developer as early in the process to avoid any unnecessary delays in starting construction of the utilities.
- _____ 9 - Prior to the installation of water mains, the Developer's engineer has submitted his certification that:
 - a. All pavement and shoulder areas within the right-of-way and/or traveled areas of the development are graded to within 6" of subgrade.
 - b. All ditches and slopes have been graded to final grade to a point 1 foot outside the right-of-way area.
 - c. Markers for the sewer laterals are visible.

- F. Prior to the beginning of construction, all water and/or sewer easements outside the boundaries of the new subdivision and/or within a complex not recorded by a subdivision plat, must be dedicated to the County. The developer is to provide a check payable to the Clerk of the Circuit Court in the amount of the recordation costs when the executed easements are returned to the Chesterfield County's Right-of-Way Section. The Right-of-Way Section will calculate the charge and inform the developer. When a VDOT permit is required to install the water and/or sewer line, the engineer needs to follow the "Review Process for Water and Sewer Lines in VDOT's Right-of-Way" (see Appendix 6). A letter from VDOT accepting the location of the water and sewer lines in the right-of-way and design of the pavement replacement is required prior to approval of the water and sewer plans. The developer is responsible to have a copy of the highway permit sent to the Department of Public Utilities prior to the start of construction within the VDOT highway.
- G. The developer must enter into a Contract with the Department. A copy of the accepted bid proposal and a completed copy of "Information for Utilities Contract form" are required to prepare the Contract. The unit price bid proposals shall be based on the approved water and sewer plans and all work must be performed by an acceptable licensed utilities contractor. Where County refunds are in the contract, the developer is required to adhere in strict accordance with the current policies and ordinance. The Board of Supervisors must approve the contracts where refunds are involved, prior to the contractor beginning construction. The developer needs to allow sufficient time (2-3 weeks) for the contracts with refunds to be approved by the Board of Supervisors.
- H. Before the utilities contractor can start work, a road grade certification must be furnished by the engineer. It shall include his verification that the entire proposed road rights-of-way where water lines are proposed have been graded as required in Appendix 1. Also, prior to the release of any on-site work, County Environmental Engineering Department must approve the erosion control devices for the subdivision.
- I. Upon meeting all the above criteria, plans will be turned over to the Construction Section for the issuance of notice to proceed. The contractor must give the Inspection Section at least 48 hours notice before construction may begin. At such time, a pre-construction meeting may be required and if so, shall be arranged by the contractor and the Inspection Section. Notification shall be given to the Principal Engineer at 748-1576.

EDITION 3

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NEW PAGES

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CHESTERFIELD COUNTY

WATER AND SEWER

SPECIFICATIONS

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FIRE PROTECTION

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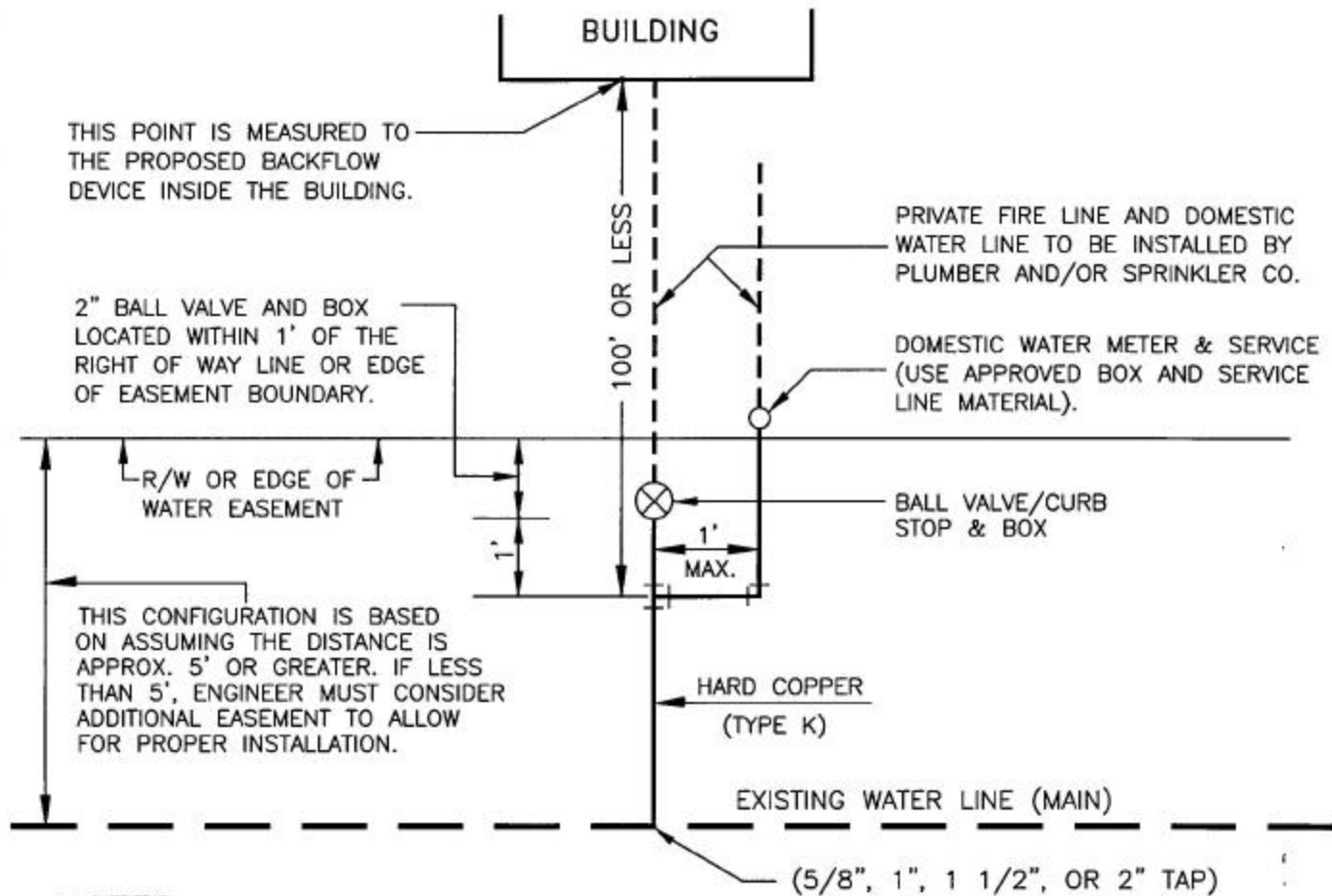
TESTING

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DEPARTMENT OF PUBLIC UTILITIES



NOTES:

- WHERE THE PUBLIC MAIN EXISTS, ALL WORK SHALL BE PERFORMED BY THE COUNTY UTILITIES DEPARTMENT UPON MAKING PROPER APPLICATION FOR SERVICE.
- ON ALL NEW WATER MAINS, DEVELOPER SHALL HAVE HIS UTILITY CONTRACTOR (ACCEPTABLE TO THE UTILITIES DEPARTMENT) INSTALL THE NECESSARY FIRE/DOMESTIC SERVICE COMBINATION, OR A SINGLE FIRE LINE WHERE THE WATER METER AND SERVICE LINE IS SEPARATE, PLUS ANY OTHER REQUIRED SERVICES I.E., IRRIGATION, ETC.
- WHERE FIRE LINE TO BUILDING IS 100' OR LESS FROM THE PUBLIC MAIN, THE FIRE LINE SYSTEM MAY BE INSTALLED ACCORDING TO THIS DETAIL OR IF THE OWNER CHOOSES TO HAVE THE DOUBLE-CHECK ASSEMBLY INSTALLED IN A VAULT OUTSIDE OF BUILDING, FIR-2 DETAIL MUST BE USED.
- ALL FIRE LINES MUST HAVE AT LEAST 3.5 FEET OF GROUND COVER.
- USE BALL VALVES AS MANUFACTURED BY FORD, McDONALD, OR APPROVED EQUAL.
- WHERE THE FIR-1 DETAIL; FOR A 2" COMBINED FIRE/DOMESTIC WATER LINE DOES NOT PROVIDE ADEQUATE SERVICE BECAUSE OF THE METER SIZE AND/OR AVAILABLE WATER PRESSURE, THE FIR-1A MAY BE USED.

[100 FEET OR LESS]

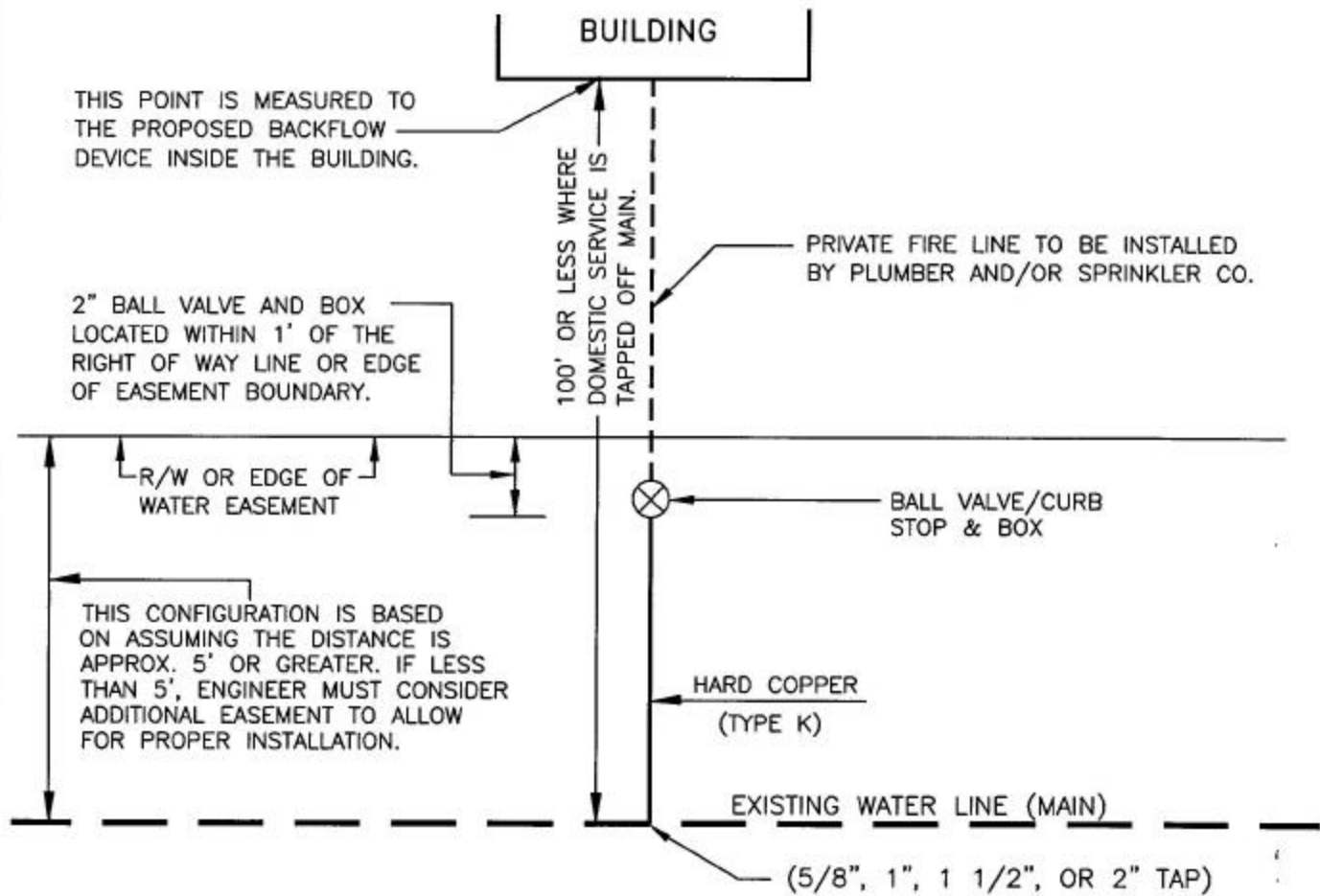
DATE
JAN. 1996

REVISIONS
JAN. 2003

TYPICAL PLAN VIEW OF PROPOSED 2"
OR SMALLER FIRE LINE SYSTEMS
(WITH DOMESTIC SERVICE LINE)

DRWG. NO.
FIR-1
(1 of 2)

DEPARTMENT OF PUBLIC UTILITIES



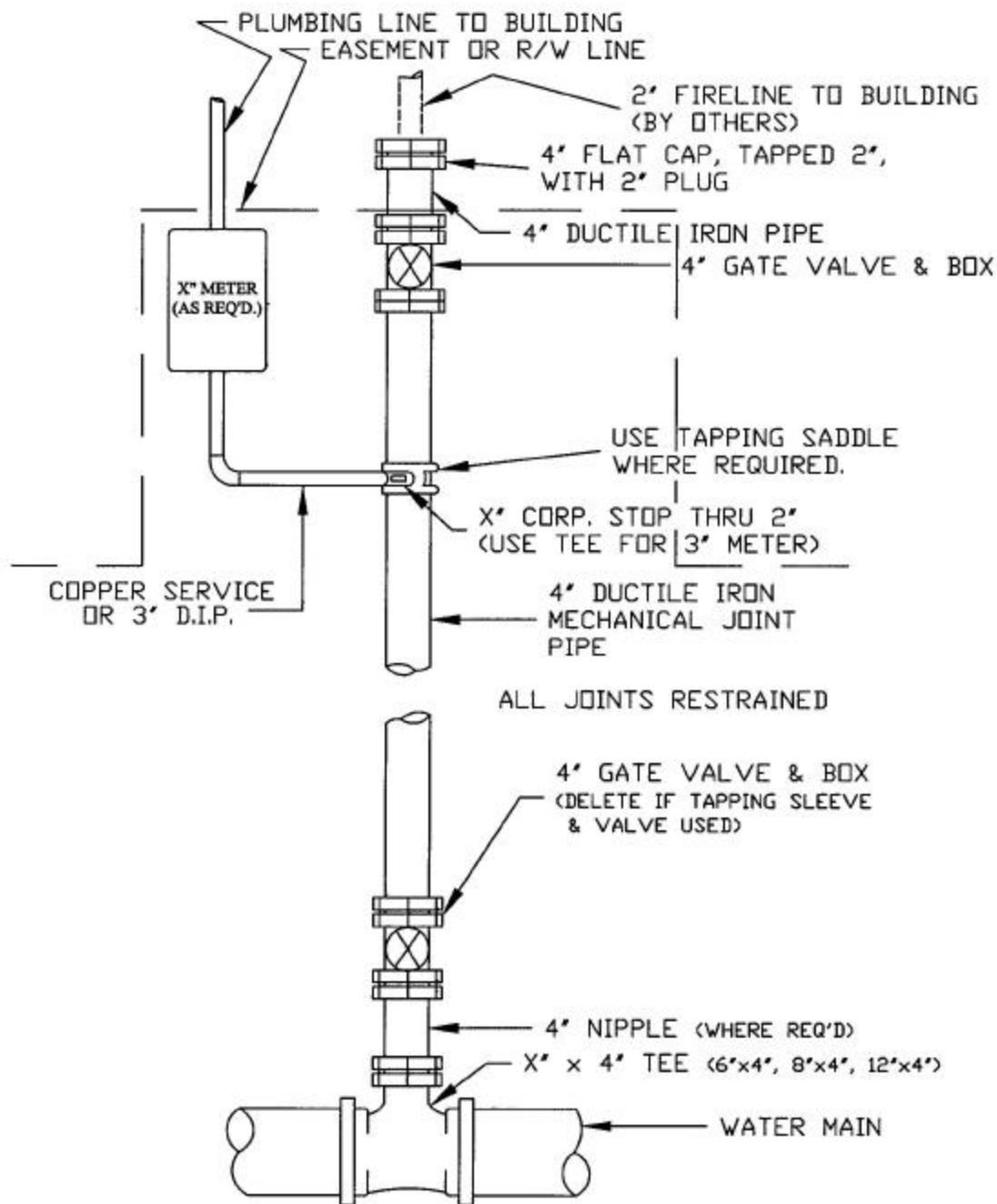
NOTES:

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- WHERE FIRE LINE TO BUILDING IS 100' OR LESS FROM THE PUBLIC MAIN, THE FIRE LINE SYSTEM MAY BE INSTALLED ACCORDING TO THIS DETAIL OR IF THE OWNER CHOOSES TO HAVE THE DOUBLE-CHECK ASSEMBLY INSTALLED IN A VAULT OUTSIDE OF BUILDING, FIR-2 DETAIL MUST BE USED.
- ALL FIRE LINES MUST HAVE AT LEAST 3.5 FEET OF GROUND COVER.
- USE BALL VALVES AS MANUFACTURED BY FORD, McDONALD, OR APPROVED EQUAL.

[100 FEET OR LESS]

DATE JAN. 2003	TYPICAL PLAN VIEW OF PROPOSED 2" OR SMALLER FIRE LINE SYSTEMS (WITHOUT DOMESTIC SERVICE LINE)	DRWG. NO. FIR-1 (2 of 2)
REVISIONS		

CHESTERFIELD COUNTY DEPARTMENT OF PUBLIC UTILITIES



NOTES:

- A. TAPPING SLEEVE AND VALVE MAY BE USED ON EXISTING LINES WITH PRIOR APPROVAL.
- B. WHERE THE FIR-1 DETAIL; FOR A 2" COMBINED FIRE/DOMESTIC WATER LINE DOES NOT PROVIDE ADEQUATE SERVICE BECAUSE OF THE METER SIZE AND/OR AVAILABLE WATER PRESSURE, THE FIR-1A MAY BE USED.

DATE
JAN. 1999

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JAN. 2003

TYPICAL PLAN VIEW OF 4" SUPPLY LINE FOR 2" FIRE LINE SYSTEM.

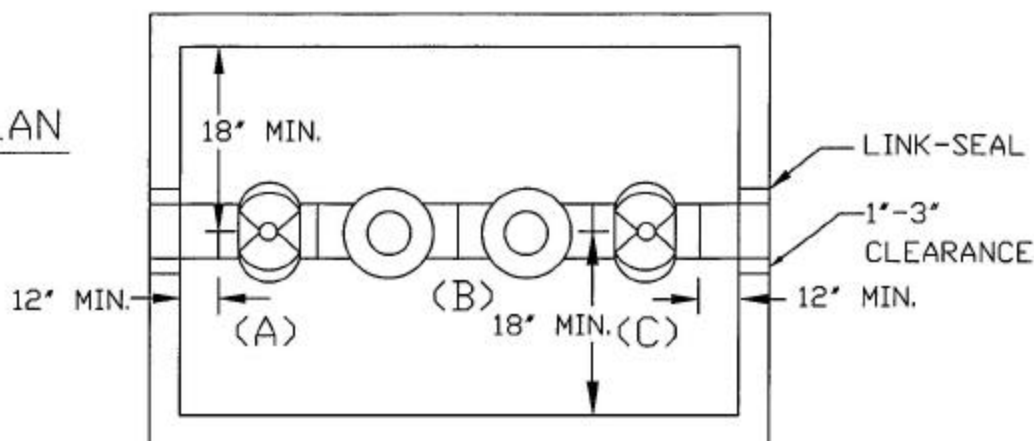
DRWG. NO.
FIR-1A

CHESTERFIELD COUNTY DEPARTMENT OF PUBLIC UTILITIES

NOTE:

1. DOUBLE CHECK DEVICE SHALL BE INSTALLED IN A BOX AS NEAR TO THE WATER MAIN AS POSSIBLE WITHOUT PLACING BOX IN AREAS SUBJECT TO VEHICULAR TRAFFIC.
2. DOUBLE CHECK ASSEMBLY MUST BE U.L. LISTED OR F.M. APPROVED AND APPROVED BY CHESTERFIELD COUNTY'S DEPT. OF UTILITIES (SEE PART IV AND PART V OF THE SPECIFICATIONS.
3. FIRE SUPPRESSION LINE SHALL BE INSTALLED IN ACCORDANCE WITH DETAIL FIR-1.
4. THE VAULT SHALL BE WATERTIGHT. THE VAULT SHALL BE COATED ON THE OUTSIDE FACE WITH A MASTIC OR BITUMINOUS COATING TO PREVENT INFILTRATION.

PLAN

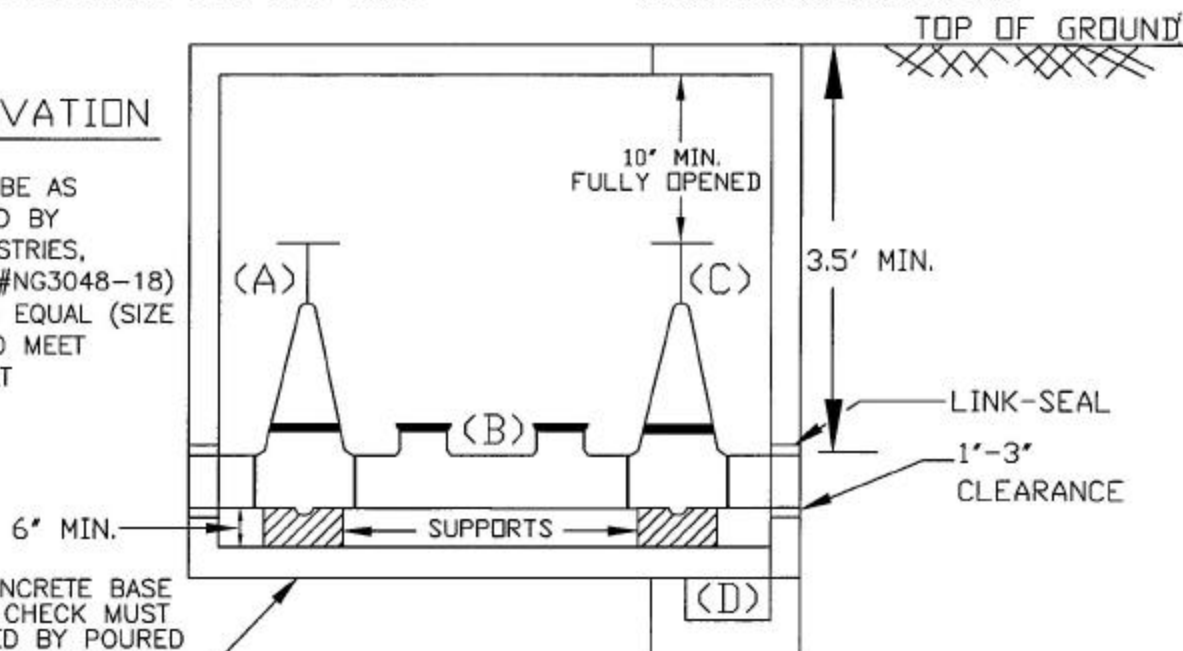


- (A) OUTSIDE STEM AND YOKE GATE VALVE
(B) DOUBLE CHECK DEVICE
(C) OUTSIDE STEM AND YOKE GATE VALVE

- (D) SUMP PUMP WHERE WATER TABLE IS
A PROBLEM OR GRAVITY DRAIN
WHERE WATER TABLE IS NOT

ELEVATION

VAULT SHALL BE AS MANUFACTURED BY CARSON-INDUSTRIES, LTD. (MODEL #NG3048-18) OR APPROVED EQUAL (SIZE NECESSARY TO MEET MINIMUM VAULT STANDARDS).



BOX WITH CONCRETE BASE AND DOUBLE CHECK MUST BE SUPPORTED BY POURED IN PLACE CONCRETE PIPE SADDLES OR METAL PIPE STANDS (COATED WITH RUST RETARDANT) COATING.

[>100 FEET]

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JAN. 1996

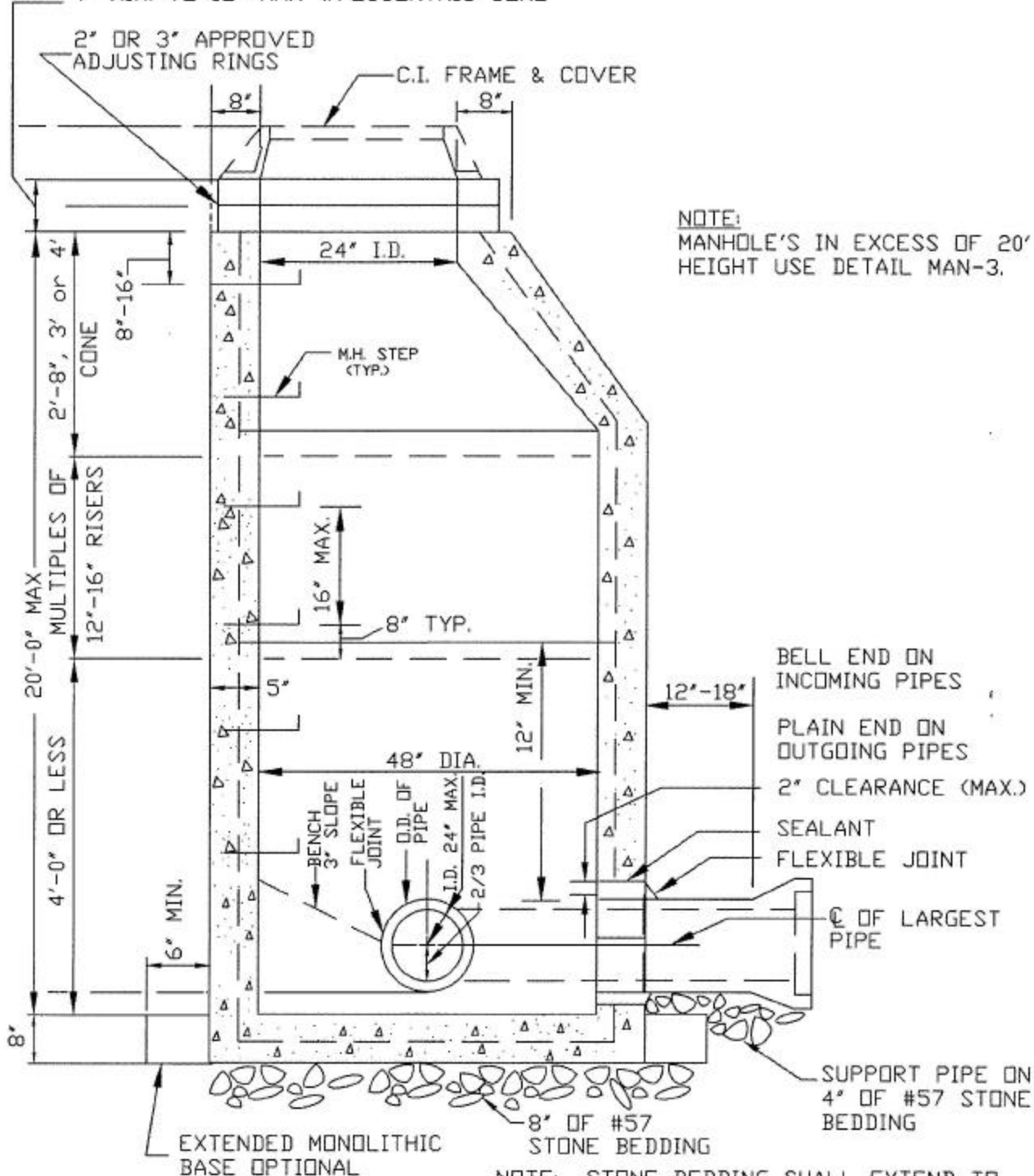
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JAN. 2003

2" OR SMALLER
DOUBLE CHECK ASSEMBLY AND VAULT

DRWG. NO.
FIR-2

CHESTERFIELD COUNTY DEPARTMENT OF PUBLIC UTILITIES

4" MIN. TO 12" MAX W/ECCENTRIC CONE



NOTE:
MANHOLE'S IN EXCESS OF 20'
HEIGHT USE DETAIL MAN-3.

NOTE: BENCH MAY BE CONC.
BRICK AND MORTAR.

NOTE: STONE BEDDING SHALL EXTEND TO
THE OUTER BOUNDARY OF ALL
UNDISTURBED AREAS SURROUNDING
THE MANHOLE.

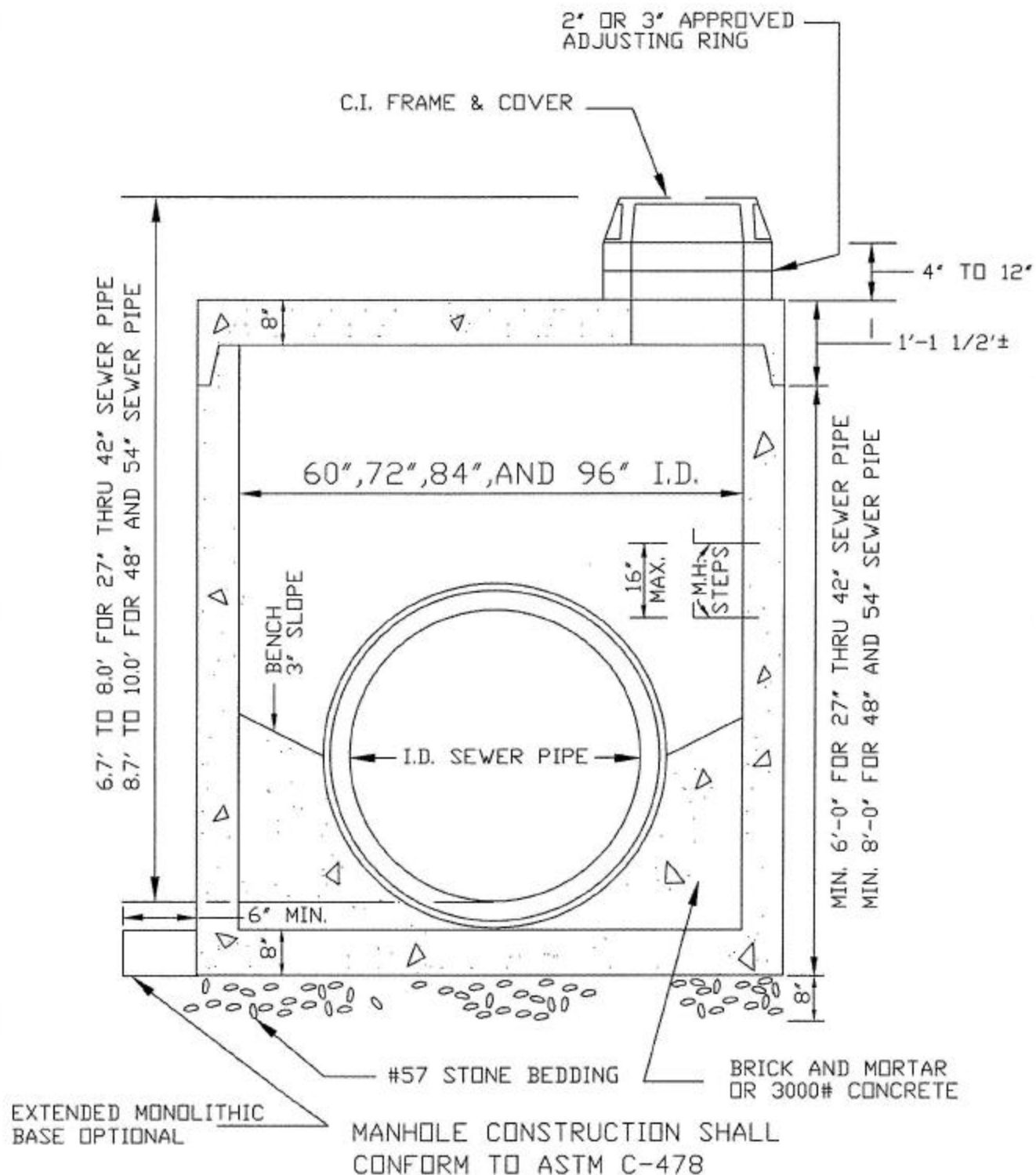
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**STANDARD PRECAST CONCRETE MANHOLE
SEWERS 8" TO 24"**

DRWG. NO.
MAN-2

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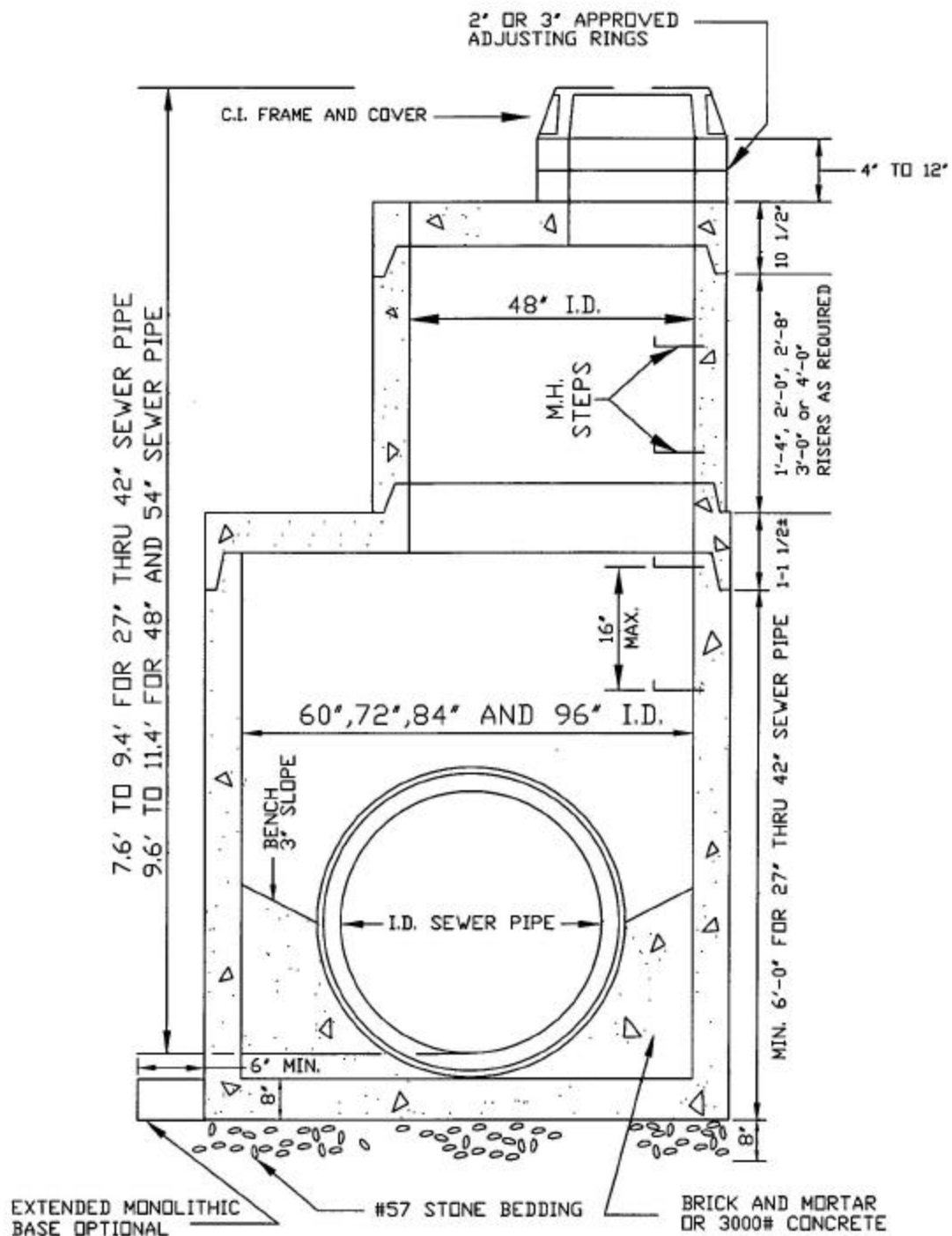
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60", 72", 84" AND 96" I.D. MANHOLE - 1

DRWG. NO.
MAN-3

CHESTERFIELD COUNTY DEPARTMENT OF PUBLIC UTILITIES



NOTE: WHERE STUBS ARE PROVIDED FOR FUTURE CONNECTIONS BENCH SHALL BE SO FORMED.

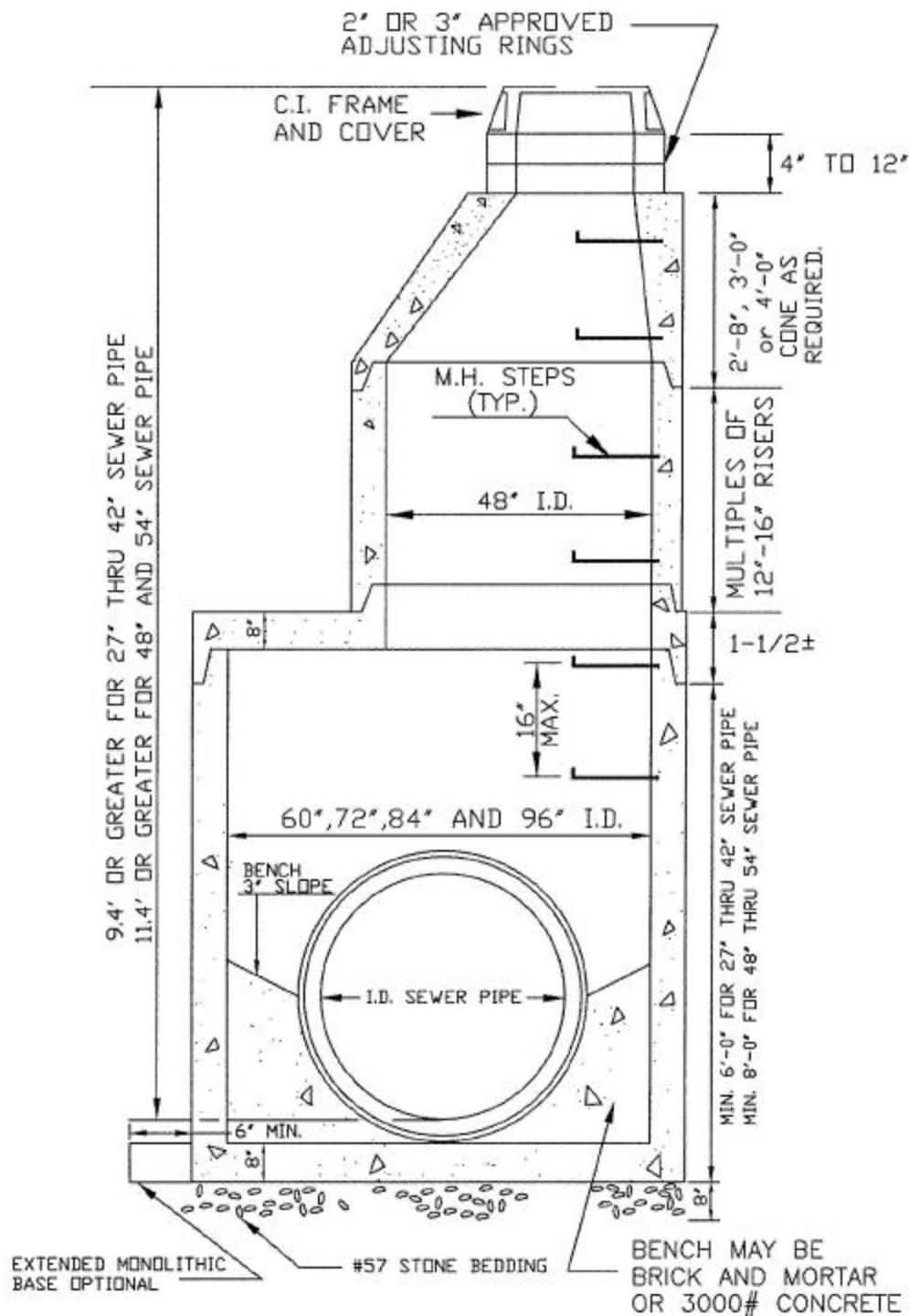
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60", 72", 84", AND 96" I.D. MANHOLE - II

DRWG. NO.
MAN-4

CHESTERFIELD COUNTY DEPARTMENT OF PUBLIC UTILITIES



NOTE: WHERE STUBS ARE PROVIDED FOR FUTURE
CONNECTIONS BENCH SHALL BE SO FORMED.

DATE:
JAN. 1996

REVISIONS:
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STANDARD PRECAST CONCRETE MANHOLE III
60", 72", 84", AND 96" I.D.

DRWG. NO.
MAN-5

CHESTERFIELD COUNTY DEPARTMENT OF PUBLIC UTILITIES

2" OR 3" APPROVED
ADJUSTING RINGS

C.I. FRAME & COVER

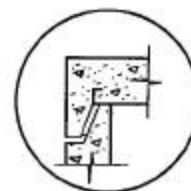
4" MIN.
12" MAX.

SEE DETAIL "A"

MANHOLE STEPS SHALL
BE ACID-RESISTANT
(TYP.)

STANDARD PRECAST
MANHOLE WITH P.V.C.
LINING

P.V.C. OR AGRU SURE-GRIP
LINING IN "FLATTOP" TYPE
MANHOLE TOP



DETAIL "A"

MULTIPLES OF
12"-16" RISERS

INVERT AND GROUT
SHALL BE DONE
WITH SULFATE RE-
SISTING CEMENT

BENCH

6" MIN.

4'-0" OR LESS

8"

EXTENDED
MONOLITHIC
BASE OPTIONAL

SUPPORT PIPE ON
#57 STONE BEDDING

8" OF STONE BEDDING

NOTE:

ACID-RESISTANT MANHOLES SHALL BE REQUIRED A MINIMUM OF 1200 FT. DOWNSTREAM OF FORCE MAIN DISCHARGE. CONSULTANTS MUST PROPERLY DESIGN THE SYSTEM THAT THE APPROPRIATE NUMBER OF MANHOLES ARE PROTECTED FROM FUTURE DETERIORATION.

LINING SHALL BE PVC FABRIC EQUAL TO AMERON OR HDPE/PPR AS MANUFACTURED BY AGRU & AMERICAST.

T-LOCK OR AGRU SURE-GRIP JOINTS SHALL BE WELDED ACCORDING TO LINER MANUFACTURER'S RECOMMENDATIONS.

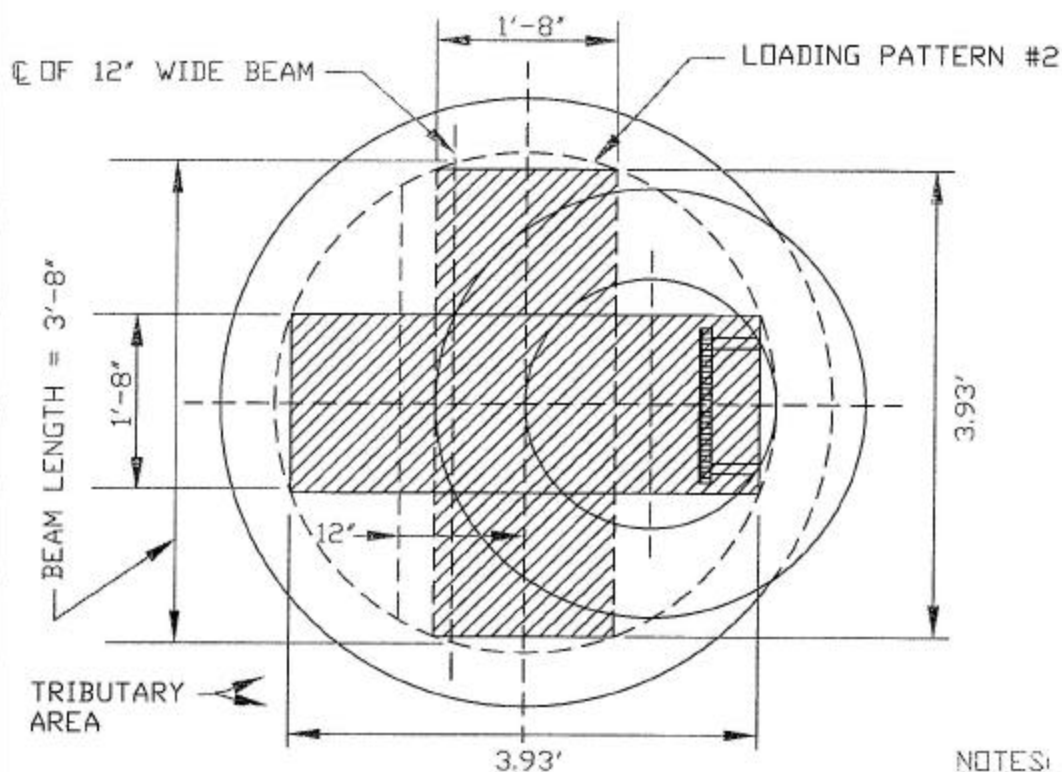
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SPECIAL ACID-RESISTANT LINING ALL MANHOLES

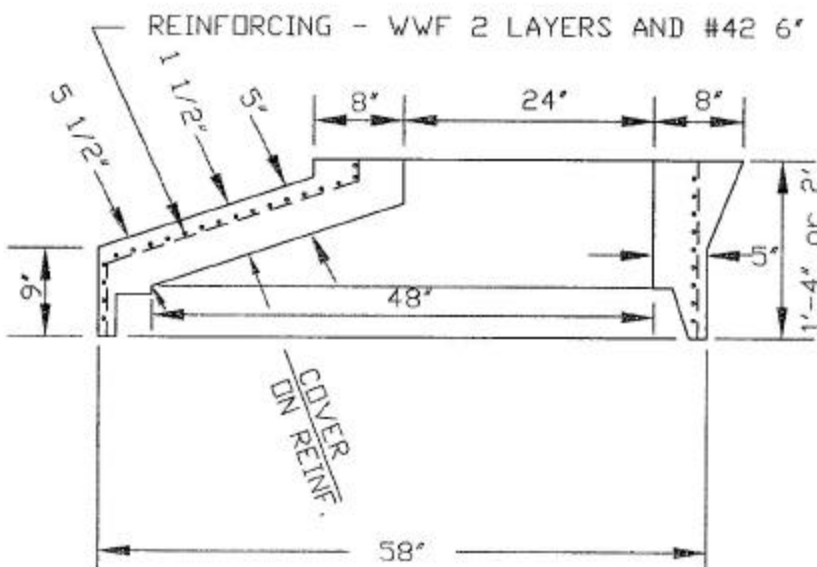
DRWG. NO.
MAN-6

CHESTERFIELD COUNTY DEPARTMENT OF PUBLIC UTILITIES



NOTES:

1. REINFORCING TO MEET ASTM A-185 FOR MESH AND ASTM A-615 FOR REBARS.
2. MANHOLE MEETS ALL REQUIREMENTS OF ASTM C-478
3. CONCRETE IS 4000 PSI COMPRESSIVE STRENGTH MINIMUM



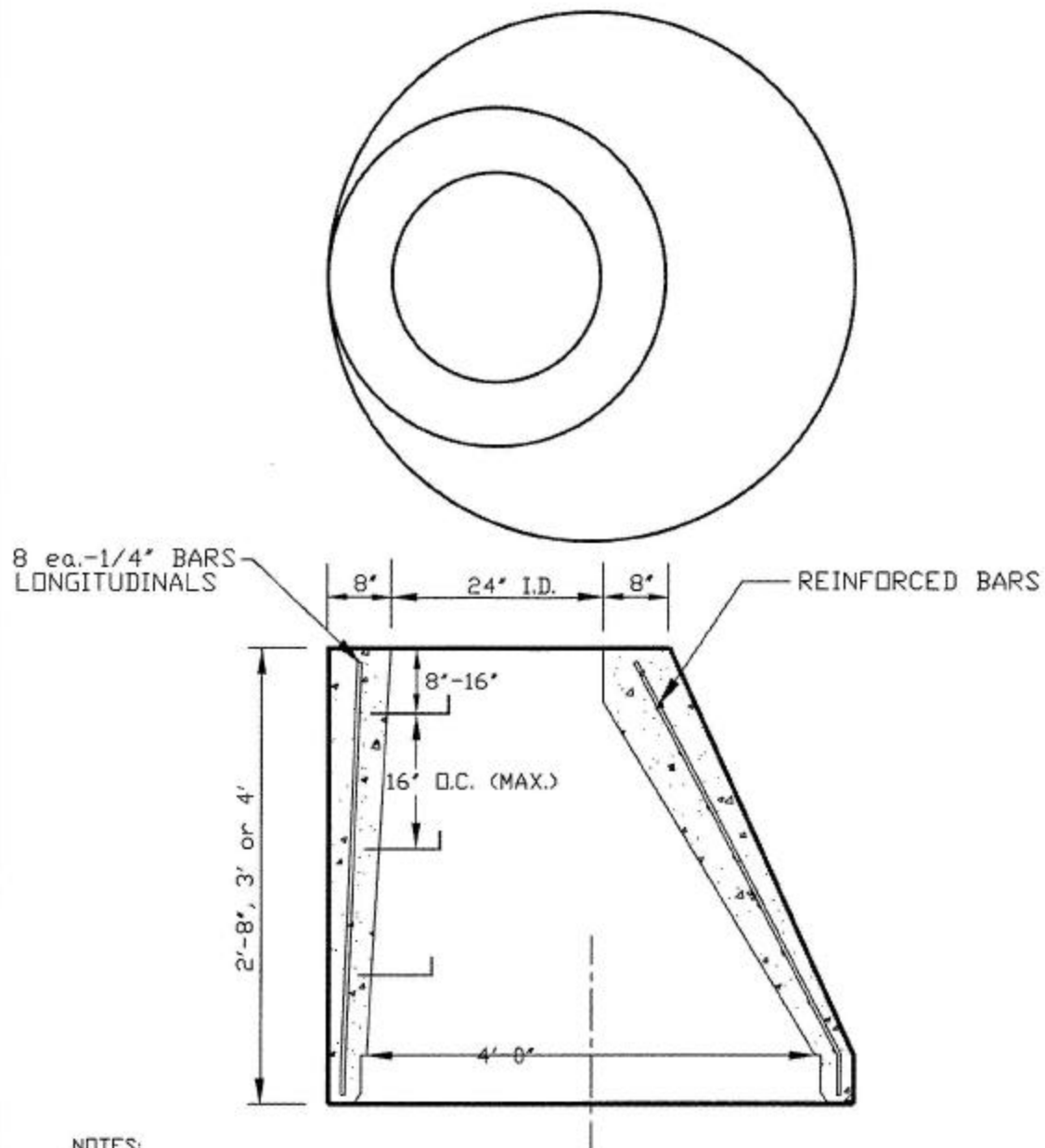
DATE
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JAN. 2003

1'-4" or 2' CONE (TYPE 1)

DRWG. NO.
MAN-7

CHESTERFIELD COUNTY DEPARTMENT OF PUBLIC UTILITIES



NOTES:

1. CONE SHALL MEET REQUIREMENTS OF ASTM C-478. O-RING GASKET JOINTS MEET REQUIREMENTS OF ASTM C443.
2. CONCRETE SHALL MEET OR EXCEED THE TEST 4000 PSI MINIMUM COMPRESSIVE 28 DAY STRENGTH.
3. APPROVED STEPS SHALL BE EQUAL, SPACED @ 16 INCHES O.C.
4. REINFORCING SHALL BE A MINIMUM .12 IN. ²/FT. (MINIMUM OF 8 EACH - 1/4" BARS ON BACK FACE) & MINIMUM OF 4 EACH - #3 BARS ON FRONT FACE AND W3.4 [5 GAL.] WIRING.)
5. A MAXIMUM OF TWO LIFT HOLES PER SECTION.

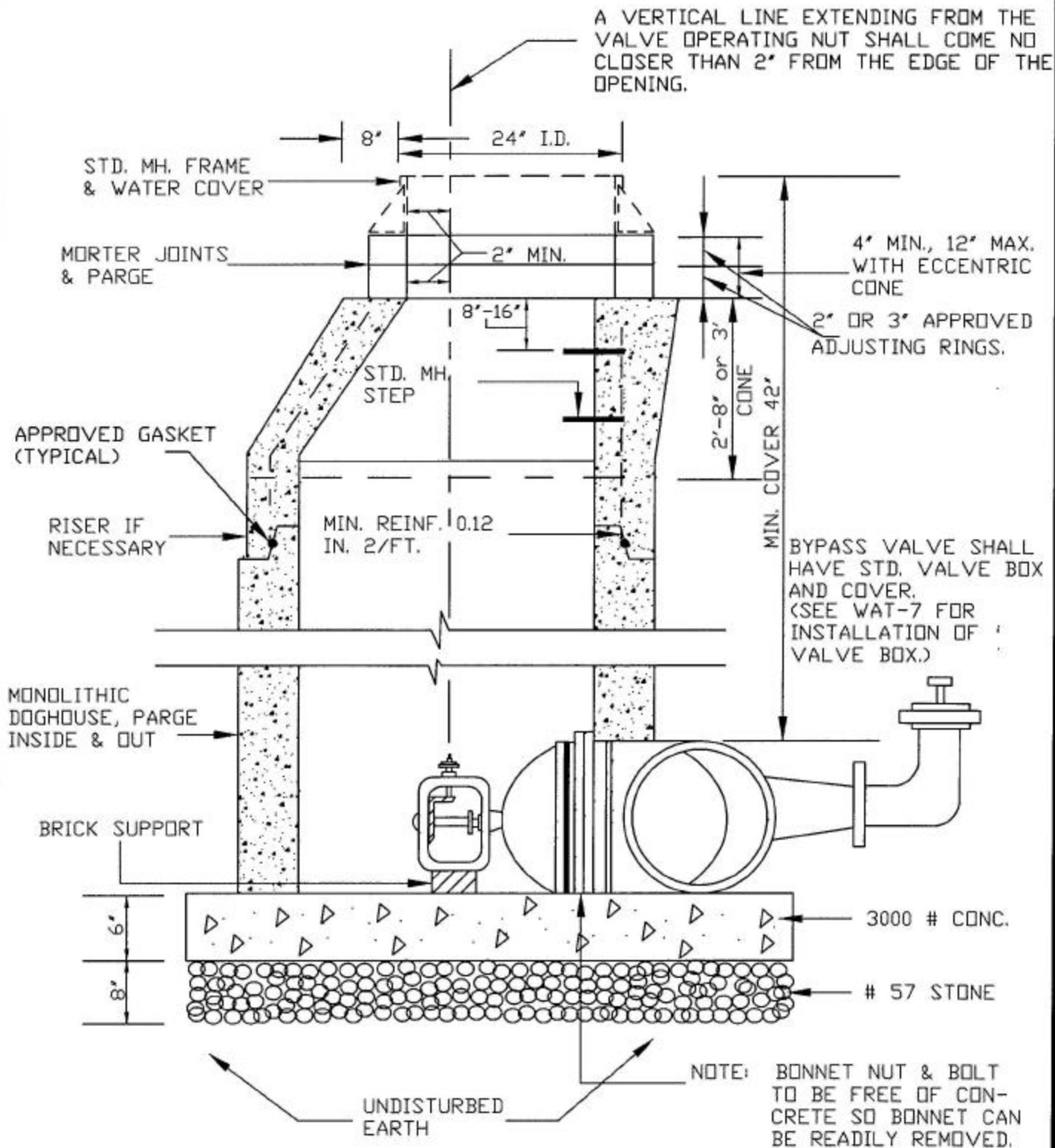
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STANDARD ECCENTRIC CONE

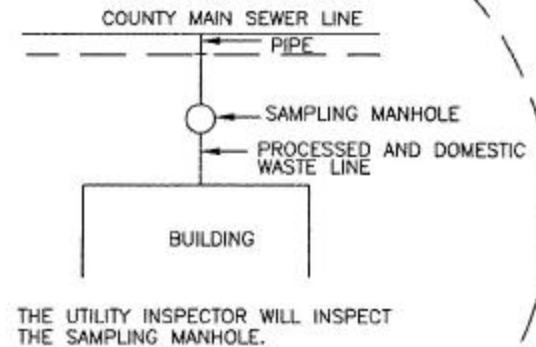
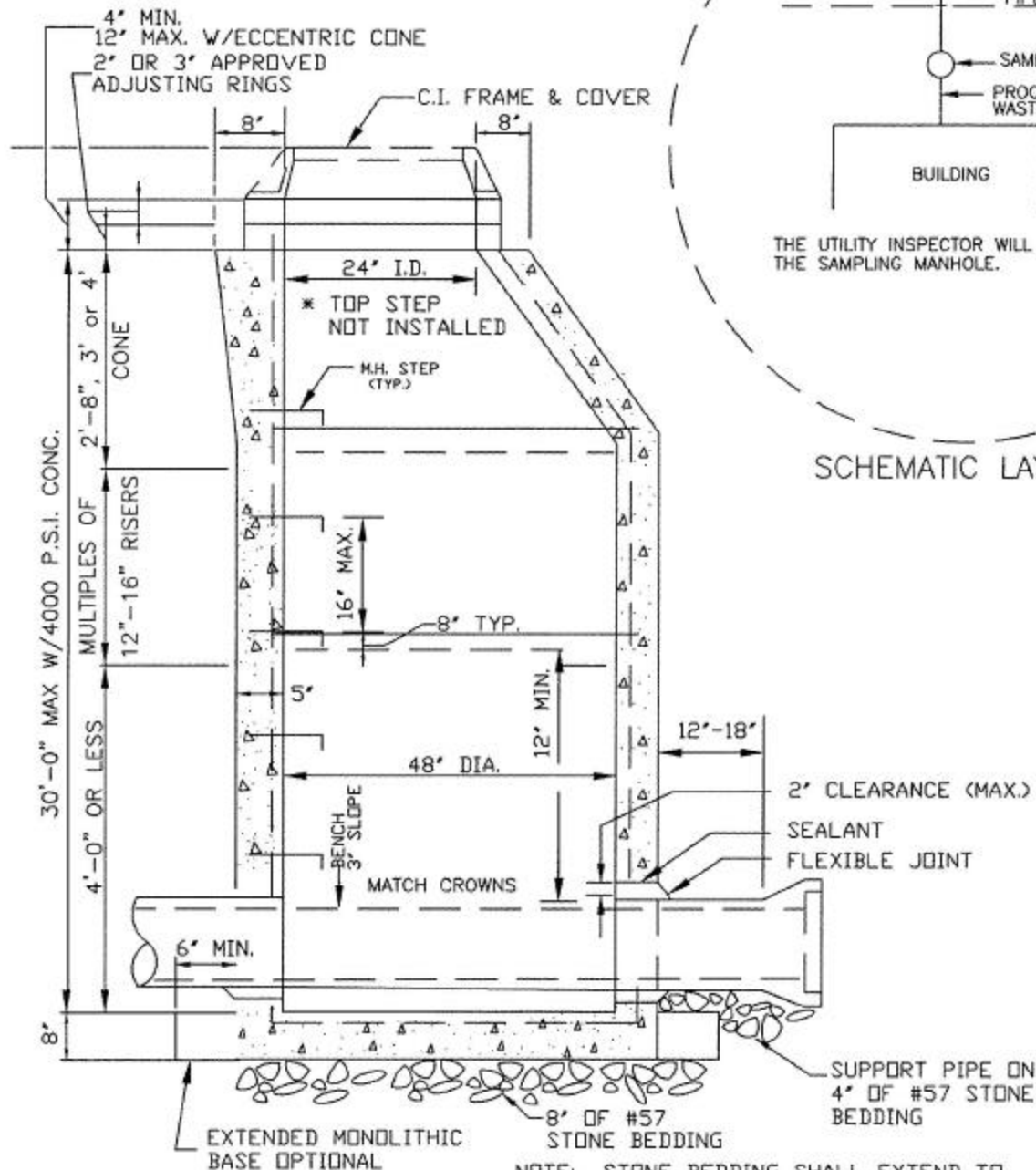
DRWG. NO.
MAN-8

CHESTERFIELD COUNTY
DEPARTMENT OF PUBLIC UTILITIES



DRWG. NO.
MAN-13

CHESTERFIELD COUNTY DEPARTMENT OF PUBLIC UTILITIES



SCHEMATIC LAYOUT

NOTE: BENCH MAY BE CONC. OR
BRICK AND MORTAR.

NOTE: STONE BEDDING SHALL EXTEND TO
THE OUTER BOUNDARY OF ALL
UNDISTURBED AREAS SURROUNDING
THE MANHOLE.

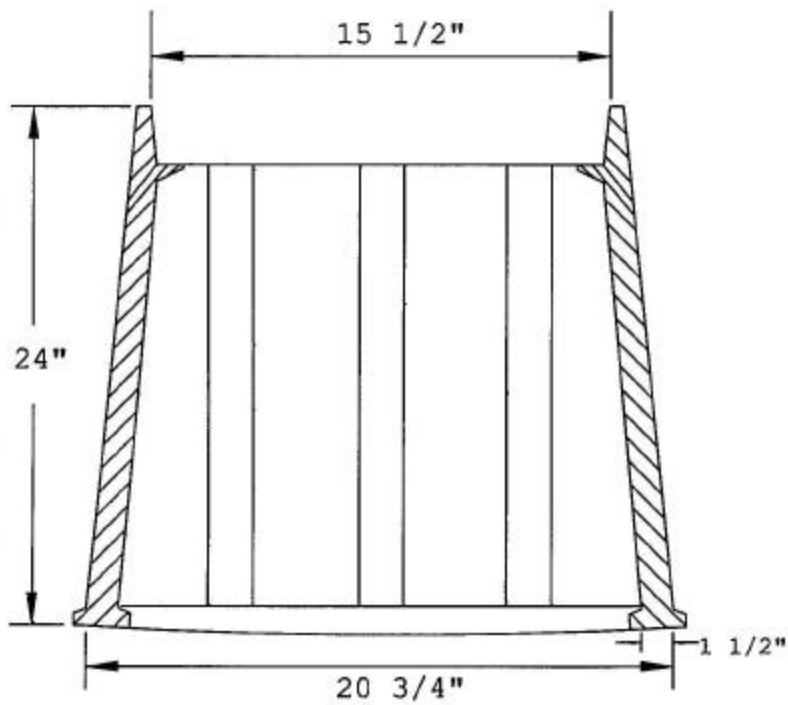
DATE
JAN. 1996

REVISIONS
JAN. 2003

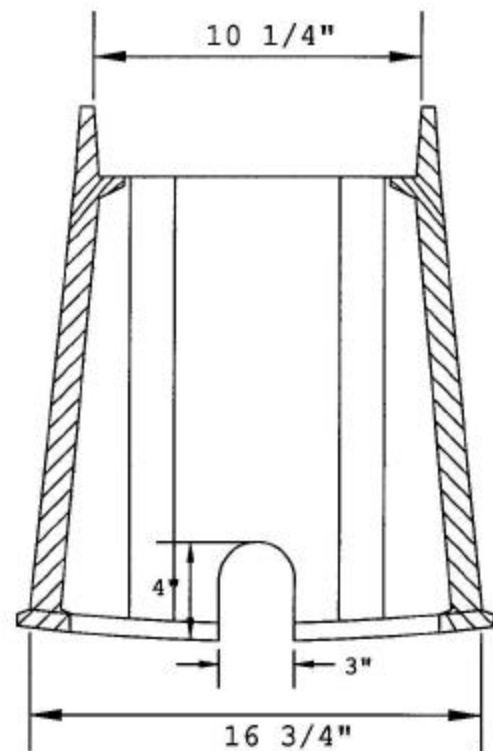
SAMPLING MANHOLE

DRWG. NO.
MAN-17

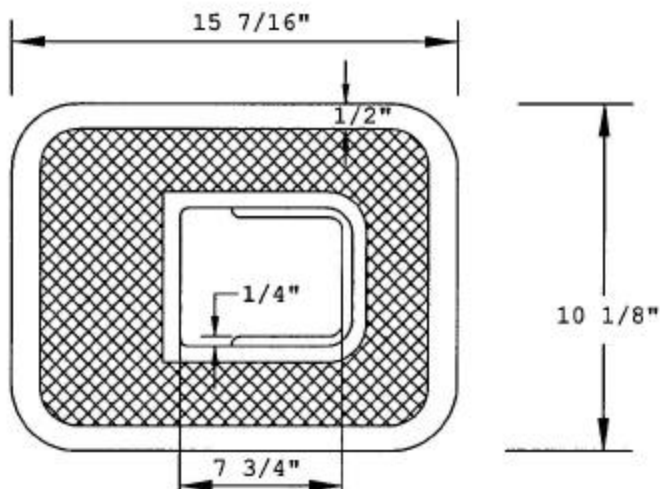
CHESTERFIELD COUNTY
DEPARTMENT OF PUBLIC UTILITIES



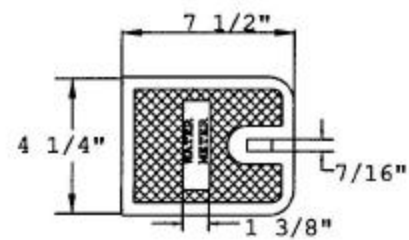
LONG SIDE VIEW



SHORT SIDE VIEW



TOP VIEW



TOP VIEW

DATE
JAN. 1996

REVISIONS
JAN. 2003

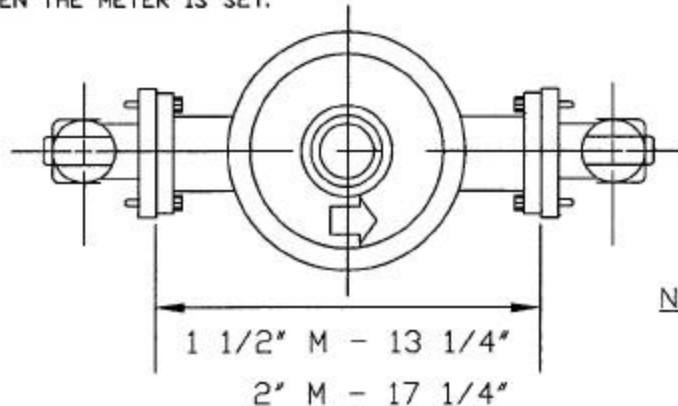
**PLASTIC METER BOX
($\frac{5}{8}"$ METERS)**

DRWG. NO.
MET-2

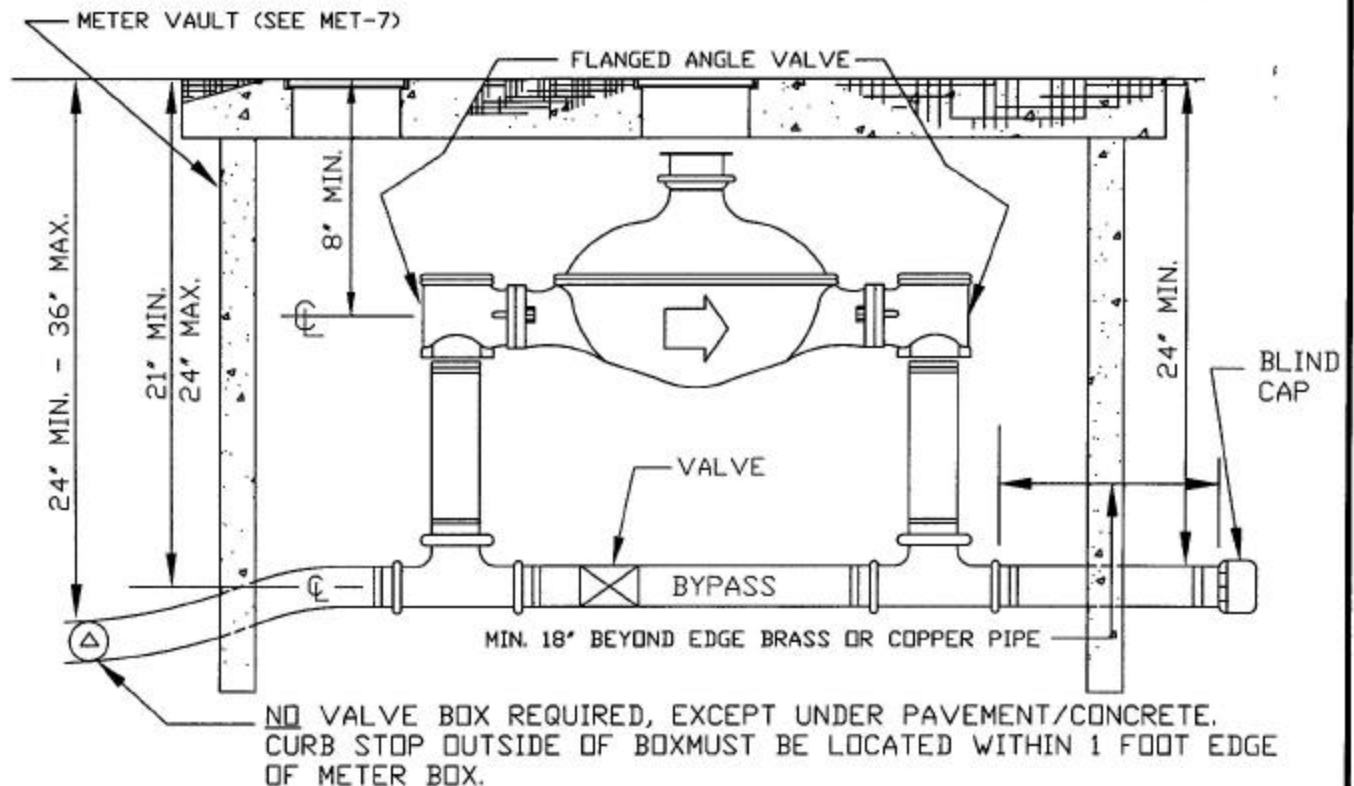
CHESTERFIELD COUNTY DEPARTMENT OF PUBLIC UTILITIES

NOTES:

1. SADDLES SHALL BE USED FOR ALL 1 1/2" AND 2" TAPS.
2. WATER SERVICE LATERALS FOR 1 1/2" AND 2" SERVICES WILL BE TYPE-K HARD COPPER. CONNECTIONS FOR 1 1/2" AND 2" SERVICES WILL SWEAT 95/5 (LEADLESS) SOLDER AND A SUITABLE FLUX OR APPROVED COMPRESSION FITTINGS. ALL CONNECTIONS AT CORPORATION STOPS WILL BE APPROVED COMPRESSION FITTINGS.
3. TAPS SHOULD BE MADE AT THE SPRING LINE OF THE MAIN LINE.
4. FOR DETAIL OF VAULT, SEE MET-7.
5. YOKE MUST BE INSTALLED WITH A METER SPACER THAT WILL BE FURNISHED TO THE CONTRACTOR BY THE UTILITIES DEPARTMENT INSPECTOR. THE SPACER WILL BE REMOVED BY THE UTILITIES DEPARTMENT WHEN THE METER IS SET.



NOTE: BYPASS SHALL BE LOCATED ABOVE OR AT FLOOR LEVEL OF METER VAULT.



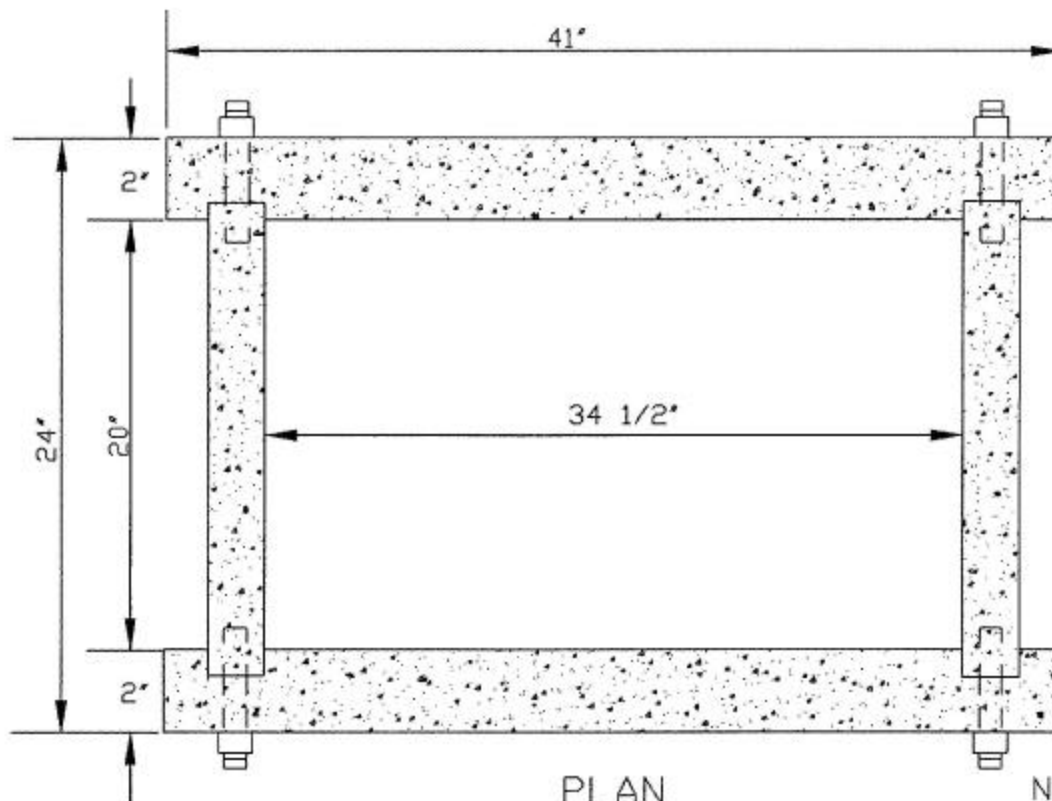
DATE
JAN. 1996

REVISIONS
JAN. 2003

1 1/2" OR 2" DISC METER SETTINGS

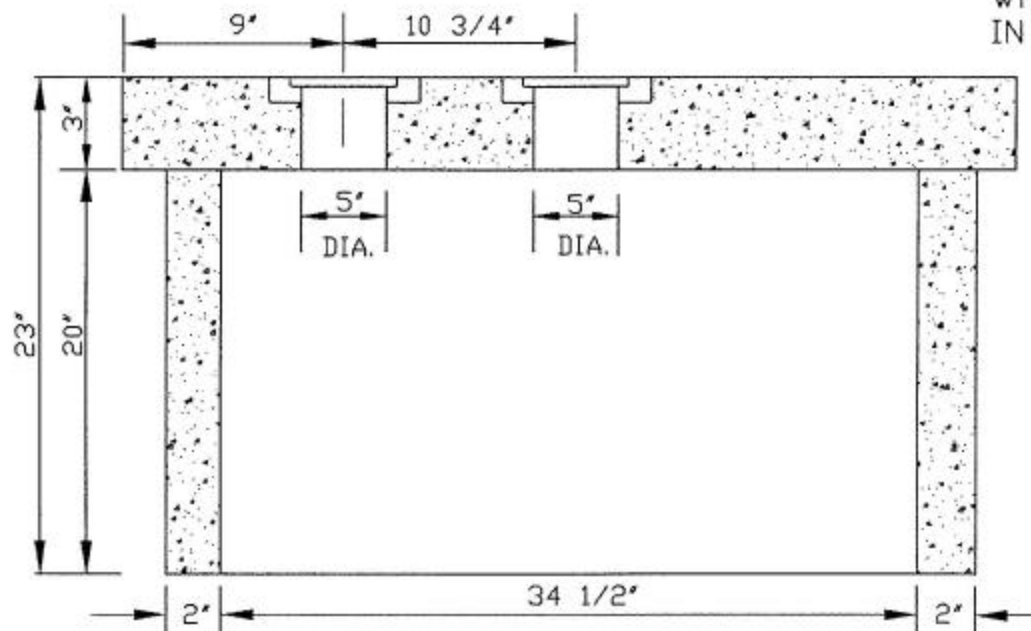
DRWG. NO.
MET-6

CHESTERFIELD COUNTY DEPARTMENT OF PUBLIC UTILITIES



PLAN

NOTE:
5" REINFORCEMENT
TOP REQUIRED
WHEN LOCATED
IN PAVED AREA.



ELEVATION

DATE
JAN. 1996

REVISIONS
JAN. 2003

1 1/2" & 2" KNOCK DOWN METER BOX

DRWG. NO.
MET-7

METAL TRAFFIC BEARING CAP WITH BRASS COUNTERSUNK SCREW PLUG

BRASS COUNTERSUNK SCREW PLUG

CAST IRON BODY-TYPICAL

CAST IRON BODY-TYPICAL

FRINISHED GRADE

2"

6"

PVC SLEEVE

RUBBER GASKET

FACTORY APPLIED EPOXY-TYPICAL

MENT OR CRETE

STANDARD PVC CAP AND PVC PLUG

PLASTIC SCREW PLUG (MPT)

PLASTIC SCREW PLUG (MPT)

FINISHED GRADE

PLASTIC FEMALE ADAPTER

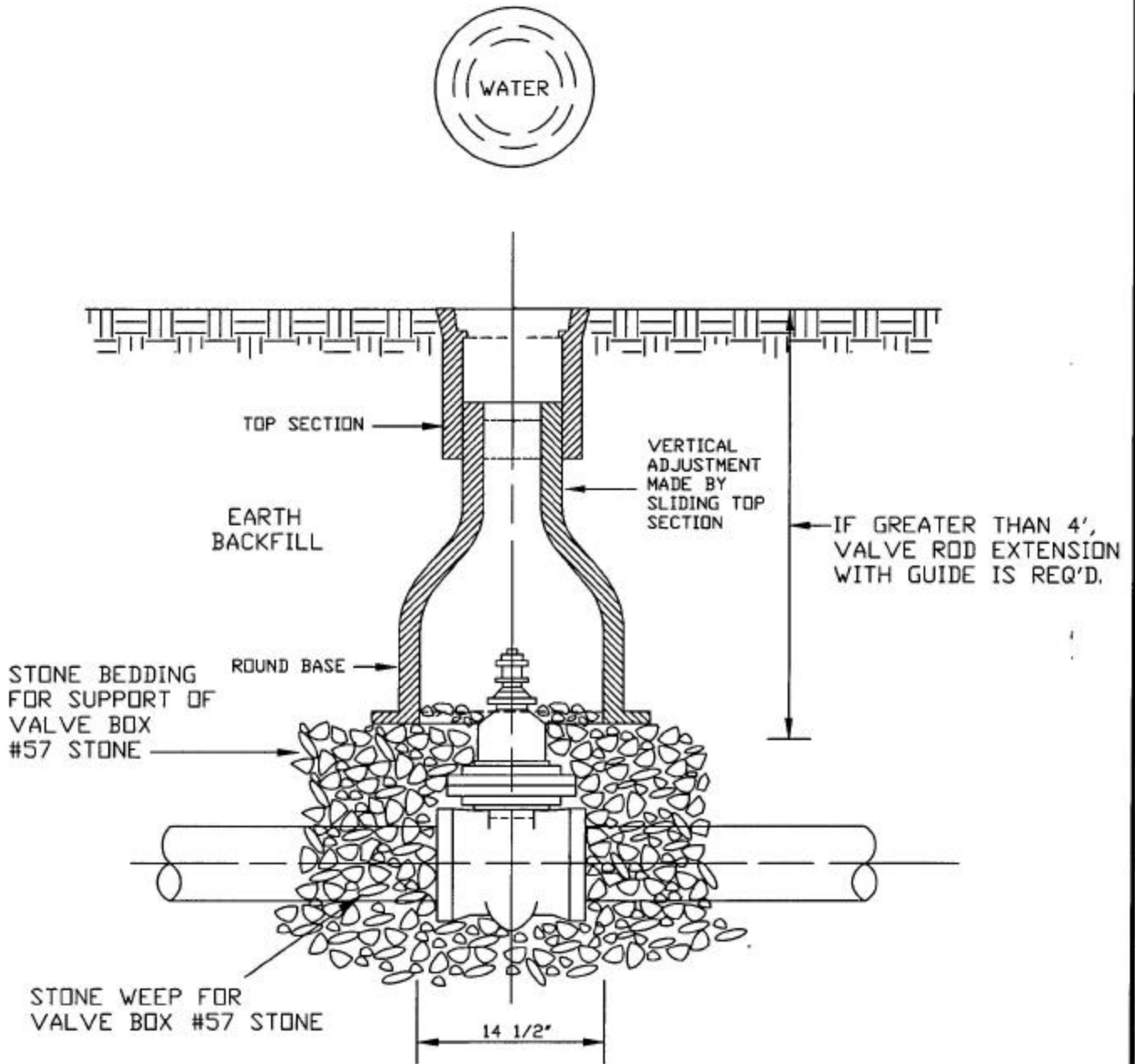
1. CLEANDOUTS TO BE INSTALLED EVERY 100'

-
- 2'x4' MARKER
AT END OF
LATERAL.
- CLEANOUT TO SURFACE
- PVC-WINGNUT PLUGS
- LATERAL
- TEE-WYE
(SWEEP)
- FLOW
- LATERAL
DOWN GRADE
TO EXISTING
MAIN / MANHOLE
1. CLEANOUTS TO BE INSTALLED EVERY 100' AND AT EVERY 90° BEND OR AS SPECIFIED BY LATEST PLUMBING CODES.
 2. TRAFFIC BEARING CAPS REQUIRED IN TRAFFIC AREAS.
 3. PLASTIC SCREW PLUG SHOULD BE FLUSH WITH FINISHED GRADE.
 4. PIPING BEYOND CLEANOUT TO BE INSTALLED PER LATEST PLUMBING CODES.
- #57 STONE BEDDING REQUIRED TO TOP OF PIPE (PVC).

#57 STONE BEDDING REQUIRED TO TOP OF PIPE (PVC).

DRWG. NO.
SEW-11

CHESTERFIELD COUNTY
DEPARTMENT OF PUBLIC UTILITIES



USE STANDARD DESIGNED VALVE BOX OF THE APPROPRIATE LENGTH (HEIGHT)
UTILIZING APPROVED MANUFACTURERS OF VALVE BOX APPURTENANCES.

DATE
JAN. 1996

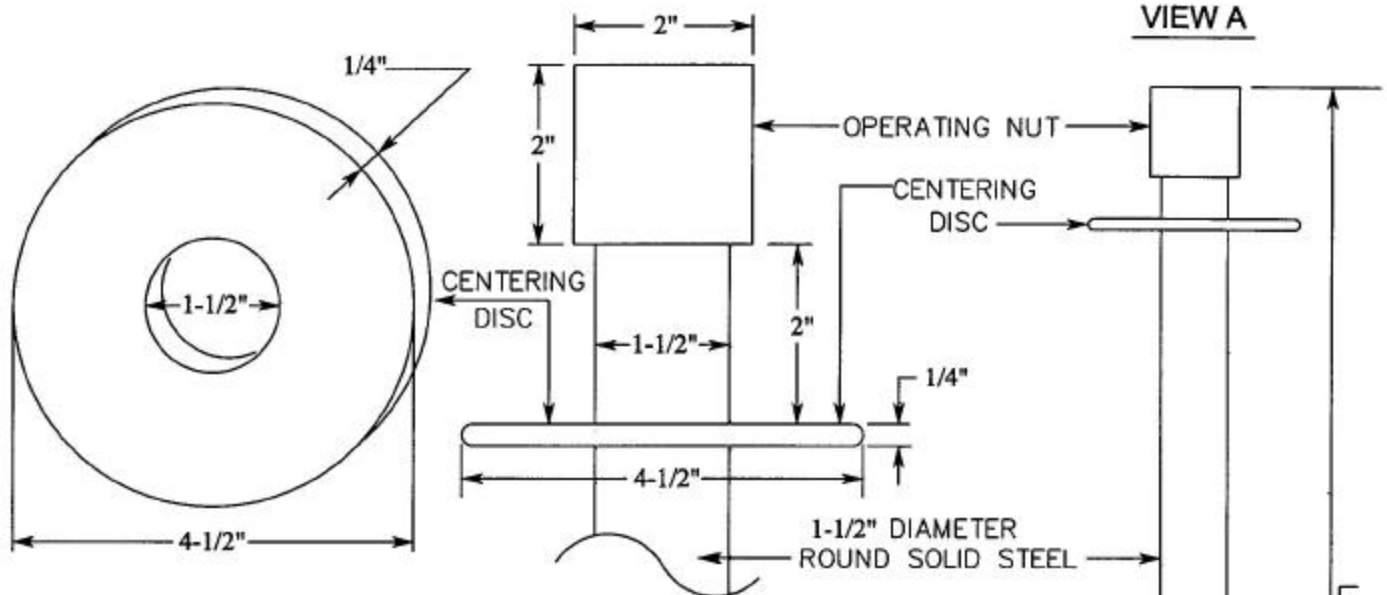
REVISIONS
JAN. 2003

SMALL VALVE BOX

DRWG. NO.
WAT-7

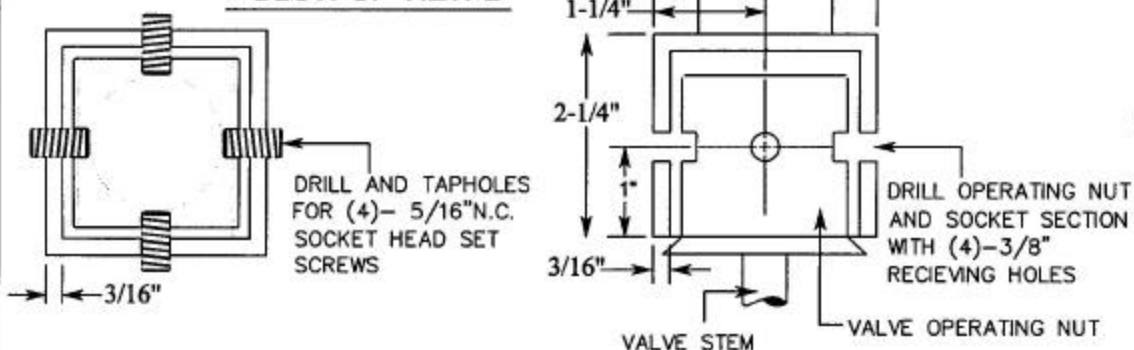
CHESTERFIELD COUNTY DEPARTMENT OF PUBLIC UTILITIES

BLOW UP VIEW A



1. Use this detail when distance from top of operating nut of valve to finish grade exceeds 4'-0".
2. All steel, welded valve extensions shall be coated with oil based enamel or other rust-preventive coating.
3. Specified length will be total length of adjustment, measured as shown.
4. The 2" square operating nut on top shall be welded to form a complete box with no openings.
5. 2-1/2" square socket on bottom shall be tapped on 4 sides for minimum 5/16"N.C. socket head set screws and screws shall be provided.
6. Center extension bar shall be 1-1/2" diameter round solid steel.
7. A 4-1/2" diameter x 1/4" steel centering disc shall be welded to the 1-1/2" steel rod, positioned 2" below the 2" square operating nut as shown.

**SOCKET SECTION
BLOW UP VIEW B**



DATE
JAN. 2003

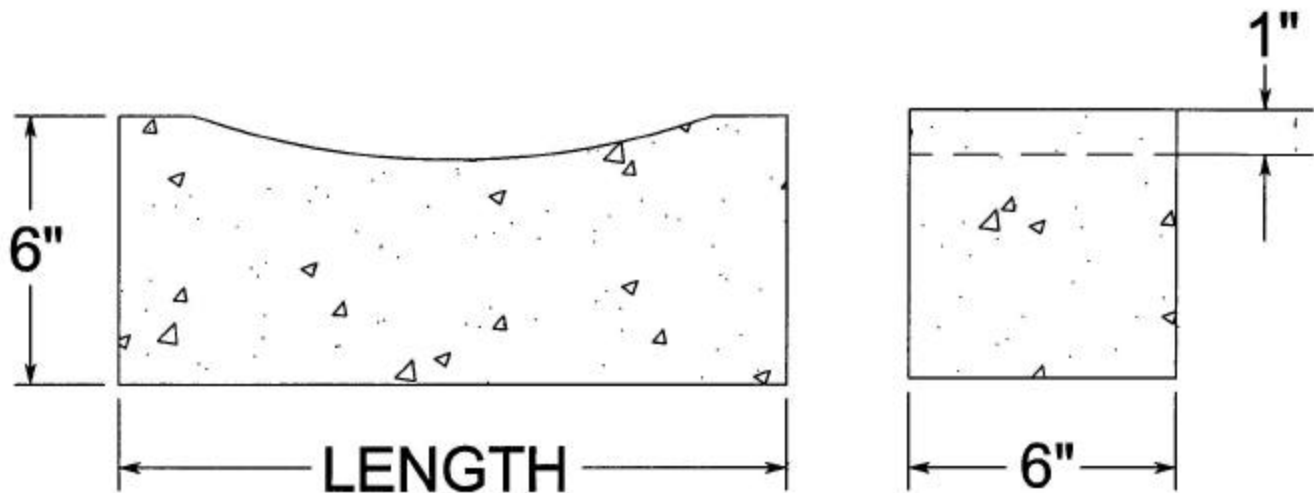
REVISIONS

VALVE KEY EXTENSION

DRWG. NO.
WAT-17

CHESTERFIELD COUNTY
DEPARTMENT OF PUBLIC UTILITIES

SIZE OF VALVE	LENGTH	VOLUME CU-FT
16"	30"	0.63
20"	36"	0.75
24"	42"	0.88
30"	48"	1.00
36"	54"	1.13



DATE
JAN. 2003

REVISIONS

CONCRETE PEDESTAL SUPPORT

DRWG. NO.
WAT-18

EDITION 3

ADDENDUM #1

NEW PAGES

TO BE INSERTED INTO

PART III

OF

CHESTERFIELD COUNTY

WATER AND SEWER

SPECIFICATIONS

PLEASE THROW THIS SHEET AWAY WHEN INSERTING NEW PAGES INTO BOOK.

			<u>PAGE</u>
		3.06 - Mulch Binding	3-4
		3.07 - General Control Measures	3-4
		3.08 - Stockpiling Excavated Material	3-5
		3.09 - Maintenance	3-5
		3.10 - Installation of Rip Rap	3-5
		3.11 - Construction in a Wetland or Water of the U.S.	3-5
SECTION	4	- Trenching, Backfill and Compaction	4-1
	I	- General	4-1
		1.01 - Related Documents	4-1
		1.02 - Description of Work	4-1
		1.03 - Quality Assurance	4-1
		1.04 - Safety	4-1
		1.05 - Job Conditions	4-1
		1.06 - Compaction	4-2
	II	- Products	4-3
		2.01 - Soil Materials	4-3
	III	- Execution	4-3
		3.01 - Inspection	4-3
		3.02 - Excavation	4-4
		3.03 - Hardpan Excavation	4-6
		3.04 - Rock Excavation	4-6
		3.05 - Blasting	4-7
		3.06 - Backfill for Trenches	4-7
		3.07 - Backfill for Structures	4-8
		3.08 - Construction in Public Streets, Roads and Alleys	4-8
		3.09 - Disposal of Waste Materials	4-13
SECTION	5	- Water Distribution System	5-1
	I	- General	5-1
		1.01 - Related Documents	5-1
		1.02 - Description of Work	5-1
		1.03 - Requirements of Regulatory Agencies	5-1
	II	- Products	5-1
		2.01 - Approved Materials	5-1

	<u>PAGE</u>
III - Execution.....	7-4
3.01 - Seedbed Preparation.....	7-4
3.02 - Liming	7-4
3.03 - Fertilizing	7-5
3.04 - Seeding	7-5
3.05 - Mulching	7-6
3.06 - Protection	7-7
3.07 - Establishment	7-7
Appendix A - Pre-Construction Meeting Checklist	APP A-1
Appendix B - VDOT Testing and Inspection Requirements for Non-Thoroughfare and Thoroughfare Plan Roadways..	APP B-1

The submission of a Bid shall constitute a warranty by the Bidder that he has complied with the requirements of this paragraph. The Bidder is bound by his bid and his bid reflects an affirmative representation that he has examined the project thoroughly.

4. **FORM OF BID.** All Bids must be made on the Bid Form contained herein. The Bidder shall type or write in ink, both in words and in numerals, the price for which he proposes to furnish all materials, plant, equipment, tools, sheeting or bracing, scaffolds and other facilities; and to perform all labor and services necessary or proper for the completion of the work in strict accordance with the true intent of the Plans and Contract Documents, and subject at all times to the approval of the Director of Utilities. Each Bidder must correctly sign his Bid in longhand and in ink, giving the correct post office address of his firm. All Bids must be signed with the firm name and by an officer having the authority to bind the company or firm by his signature. If the Bidder is a corporation and the individual signing the Bid is not the President or a Vice President of the Bidder, proof of the authority of the individual signing to bind the Bidder must be submitted with the Bid. If the Bidder is a partnership, copies of appropriate documents relating to the authority of the individual signing to bind the partnership must be submitted with the Bid.

No interlineation, alteration or erasure of the Bid will be accepted. No oral, telegraphic, or telephonic proposals, modifications, or interpretations will be considered. Bids concerning separate bid invitations, must not be combined on the same form or placed in the same envelope. Bids submitted in violation of this provision may not be considered.

5. **BID GUARANTY.** Each Bid must be accompanied by a Bid Bond or certified check for an amount not less than 5 percent of the total amount of the Bid, as evidence of good faith and as a guaranty that, if awarded the project, the Bidder will execute the Contract and furnish the required Bonds.

If a Bid Bond is offered as guaranty, the Bond must be on a form acceptable to the Owner, and made by a Surety Company qualified and authorized to do business in the State of Virginia and must be signed or countersigned by an agent qualified for the execution of such instruments and must include necessary papers to show himself qualified, such as a current power of attorney. If a certified check is offered as guaranty, it shall be made payable to Treasurer, Chesterfield County, Virginia. The Owner will return all certified checks to the Bidders once the Contract has been executed by the successful Bidder.

6. **DELIVERY OF BID.** Each Bid must be submitted in an envelope and plainly marked with the project name and number. The name, correct post office address and Virginia Contractor No. of the Bidder shall be shown on the outside of the envelope. No Bid shall be considered which has not been received by the Owner prior to the time and date fixed for the opening of bids. If sent by mail (preferably registered), the sealed Bid marked as described above shall be enclosed in an additional envelope addressed to the Owner.
7. **OMISSIONS AND DISCREPANCIES.** Should a Bidder find discrepancies in, or omissions from, the plans or other Contract Documents, or should he be in doubt as to their meaning, he should at once notify the Engineer who may issue a written instruction to all Bidders.
8. **WITHDRAWAL OF BIDS.** No bid can be withdrawn after the scheduled closing time for receipt of bids for sixty (60) calendar days, except as provided in Section 2.2-4330(i), Code of Virginia which states that the bidder shall give notice in writing of his claim of right to withdraw his bid within two business days after the conclusion of the bid opening procedure. Any withdrawal request made to the Director of Purchasing must be accompanied by bidder's original work papers, or such request will be rejected. In order for work papers, documents and materials submitted pursuant to this section to be deemed a trade secret or proprietary information pursuant to Code of Virginia, subdivision F of subsection 2.2-4342, a bidder must expressly invoke the aforementioned statute in the notice or withdrawal and specifically state the reasons why protection under 2.2-4342F is necessary.
9. **REJECTION OF BID.** The Owner reserves the right to waive irregularities and technicalities and to reject any and/or all Bids. Without limiting the generality of the foregoing, any Bid which is incomplete, obscure, or irregular may be rejected; any Bid having interlineation, erasures or corrections may be rejected; any Bid accompanied by an insufficient or irregular certified check or Bid Bond may be rejected. Not more than one Bid from any individual, firm partnership, or corporation, under the same or different names, shall be submitted. Reasonable grounds for believing that any Bidder is interested in more than one Bid on the same project will cause the rejection of all Bids in which the Bidder is interested.

15. **QUALITY EXPECTATION STATEMENT.** Chesterfield County, through its "Total Quality Improvement" initiative, is a recognized leader in providing quality products and services at the most effective cost possible. Therefore, the County fully expects, requires, and shall hold all Contractors, and all agents, staff, representatives, and subcontractors of the Contractor, responsible for, and accountable to, the highest quality standards of professional workmanship, products and services. In the spirit of the county's total quality improvement initiative, the Contractor shall be expected to become a member of the team and perform or provide all work, services and products with a target of "zero defects - zero rework".

16. **AWARD PHILOSOPHY.** Chesterfield County will make award to the lowest responsible and responsive bidder. The lowest responsive bidders) may be required to furnish a written statement of their qualifications, to include references, prior to any such award. The County may contact all references furnished by bidders. The right is further reserved by the County to contact references other than, and/or in addition to, those furnished by the bidder.

If, in the sole opinion of the County, a bidder is determined to be non-responsible as a result of any investigation conducted by or for the County, award will not be made to that bidder.

17. **PROPRIETARY INFORMATION.** Section 2.2-4342 of the Code of Virginia states: "Trade secrets or proprietary information submitted by a bidder, offeror, or contractor in connection with a procurement transaction shall not be subject to public disclosure under the Virginia Freedom of Information Act; however, the bidder, offeror, or contractor must invoke the protection of this section in writing and prior to or upon submission of the data or other materials, and must clearly and specifically identify the data or other materials to be protected and state the reasons why protection is necessary. Bidders, offerors, or contractors may not declare their entire bid or proposal as proprietary, nor may they declare any pricing as proprietary.

18. **COMMITMENT TO DIVERSITY AND CHESTERFIELD BUSINESSES.** Chesterfield County is a rapidly growing progressive community consisting of an increasingly diverse population. This diversity provides for a dynamic and robust community that promotes growth. Chesterfield County believes that all of its citizens should benefit from this economic growth without regard to race, color, religion or economic status.

The county is committed to increasing the opportunities for participation of minority business enterprises, woman-owned businesses and businesses located in Chesterfield County to ensure diversity in its procurement and contract activities. These businesses are encouraged to respond to all Invitations for Bids and Requests for Proposals. In addition, the county strongly encourages each contractor and/or supplier with which the county contracts to actively solicit minority business enterprises, woman-owned businesses and businesses located in the county as subcontractors/suppliers for their projects.

Upon award/renewal of the contract, the successful bidder/offeror shall furnish data requested on the Certification of Subcontractor/Supplier Activity form included in this IFB/RFP document. This information will enable the county to document the dollar level of activity and measure the success of its purchasing and contracting efforts in this endeavor.

19. DEFINITIONS. For purposes of Chesterfield County's classification and reporting program, in cooperation with the Virginia Department of Minority Business Enterprise, the following definitions apply:

Woman-Owned Business (WOB) - a business concern that is majority owned by a woman who also controls and operates the business. In this context, "control" means exercising the power to make policy decisions, and "operate" means being actively involved in the day-to-day management.

Minority Business Enterprise (MBE) - a business enterprise that is owned and controlled by one or more socially and economically disadvantaged persons. Such disadvantage may arise from cultural, racial, chronic economic circumstances or background or other similar cause. Such persons include, but are not limited to: African Americans, Asian Americans, Native Americans, Eskimos and Aleuts. (Reference: 2.1-6432.1 of the *Code of Virginia*)

Chesterfield Business (CB) - any private business enterprise, located within the jurisdictional boundaries of Chesterfield County.

Minority - a person who is a citizen of the United States or a legal resident alien and who satisfies one or more of the following:

Asian Americans - all person having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent or the Pacific Islands including but not limited to Japan, China, Vietnam, Korea, Samoa, Laos, Cambodia, Taiwan, northern Marinas, the Philippines, U. S. territory of the Pacific, India, Pakistan, Bangladesh and Srilanka and who are regarded as such by the community of which these persons claim to be a part.

African Americans - all persons having origins in any of the original peoples of Africa and who are regarded as such by the community of which these persons claim to be a part.

Hispanic Americans - all persons having origins in any of the Spanish-speaking peoples of Mexico, South or Central American, or the Caribbean Islands or other Spanish or Portuguese cultures and who are regarded as such by the community of which these persons claim to be a part.

Native Americans - all persons having origins in any of the original peoples of North America and who are regarded as such by the community of which these persons claim to be a part or who are recognized by a tribal organization.

Eskimos and Aleuts - all persons having origins in any part of Northern Canada, Greenland, Alaska, and Eastern Siberia and who are regarded as such in the community of which these persons claim to be a part.

Members of other groups - all other individuals found to be socially and economically disadvantaged by the United States Small Business Administration under Section 8(a) of the Small Business Act (15USC637)[a]. (VR486-01-02; September 9, 1992)

The following form will be sent to the contractor by the Purchasing Department for completion at the time of award/renewal, as appropriate.

CERTIFICATION OF ACTIVITY OF MINORITY BUSINESS ENTERPRISES,
WOMAN-OWNED BUSINESSES, AND CHESTERFIELD BUSINESSES WHO ARE
SUBCONTRACTORS/SUPPLIERS FOR THIS PROJECT/CONTRACT

Contractors shall furnish the information requested below regarding subcontractor(s) or supplier(s).

Name and Address of Subcontractor/Supplier	(3) MBE	(3) WOB	(3) CB	Commodity or Service	Dollar Amount

If a continuation of this list of subcontractors/suppliers is needed, please attach additional pages to this form.

I have no MBE, WOB or CB applicable to this contract _____(3)

Contractor hereby certifies that the above information is correct.

Complete Legal Name of Firm: _____ Date: _____
(Type or Print)

Form Prepared By: _____

Project Name/Number: _____

BID FORM

To: _____
For the Construction of: _____

The undersigned Bidder has carefully examined the site of work, the Plans, the General Conditions, Technical Specifications, the Agreement, and the Form of Performance and Labor and Material Payment Bonds for the construction of the above named project, and in compliance with the Advertisement and/or Bid Document dated _____ will provide all the necessary machinery, tools, apparatus, and other means of construction, and do all the work and furnish all materials called for in accordance with the requirements of the County and the true intent of the Contract Documents, and will complete the Contract within _____ calendar days.

For the Total Sum of: _____
_____ () DOLLARS

The undersigned Bidder further understands that all supplies and materials covered by this Bid shall be new and of the best quality and the highest grade workmanship. The Bidder certifies by the submission of this Bid that there has been no violation of copyrights or patent rights in manufacturing, producing, or selling the product or services shipped or ordered as a result of this Bid. The successful Bidder shall, at his own expense, defend any and all actions or suits charging such infringements, and will save Chesterfield County, its officers, employees, and agents harmless from any and all liability, loss, or expense occasioned by any such violation.

The Bidder acknowledges receipt of the following Addenda:

Accompanying this Bid is a Bid Bond/certified check in the amount of _____ payable to Treasurer, Chesterfield County, Chesterfield Courthouse, Virginia, which is to be forfeited to the extent necessary to make up the difference between the Bid and the second low bid, or if the undersigned shall fail to execute the Agreement and furnish satisfactory Performance and Labor and Material Payment Bonds under the conditions and within the time specified. If the Bid Bond or guarantee is not sufficient to make up the difference between the Bid and the second low bid, together with any consequential damages, the undersigned Bidder agrees to pay the Owner any losses in excess of the bond or guarantee.

shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its BOND shall be in no way impaired or affected by any extension of the time within which the OWNER may accept such BID; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

_____(L.S.)
Principal

Surety

By: _____

IMPORTANT - Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

Contract
No. _____

The Contractor shall not kill, deface or cut down trees unnecessarily, both within and outside of project work areas or easements.

The Contractor shall be responsible for all damage to property not in the Work area or easements.

37. SUBSURFACE CONDITIONS

The Contractor shall promptly, and except in an emergency, before such conditions are disturbed, notify the owner in writing of subsurface or latent physical conditions at the site differing materially from those indicated in the Contract Documents; or of physical conditions at the site, either unknown or differing from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents.

38. INDEPENDENT TESTING

The Owner may employ an independent testing laboratory to conduct tests of materials, supplies, machinery, tools, or other equipment supplied by the Contractor when the Owner believes it to be necessary to assure compliance with the Contract Documents. The Contractor shall cooperate with the Owner in facilitating these tests.

39. EXTRA WORK - FORCE ACCOUNT

Any work that is necessary for Completion of the Work that is not described in the Scope of Work (Paragraph 17 of the General Conditions) is Extra Work and shall be paid for in one of the following manners:

- A. At a price agreed upon in writing between the Contractor and Owner.
- B. At actual cost plus twenty percent (20%), or if the Extra Work is performed by a previously approved subcontractor, at actual cost plus twenty-five percent (25%). Actual cost shall include only the necessary labor (including workmen's compensation, insurance, premiums and payroll taxes), equipment rental and materials (including fuel and lubrication for equipment used in performing the Extra Work). Equipment rental cost shall be the amount actually paid by the Contractor for rental of the equipment, pro-rated for the time the equipment was used to perform the Extra Work, or the pro-rated rental rate for the equipment as shown in the latest rate schedule compiled by the Associated Equipment Dealers, whichever is lower. The Contractor

shall not be entitled to equipment rental costs for using equipment owned by the Contractor in performing Extra Work. The Engineer shall determine the Contractor's actual cost for performing Extra Work, and the Engineer's determination shall be binding on the Contractor. Under no circumstances shall the Contractor be entitled to any sum of money for performing Extra Work, or for any delays that the Contractor alleges it suffered as a result of performing Extra Work, above actual cost plus 20% (or 25% when applicable).

On or before the 20th day of the month succeeding the month in which Extra Work is performed, the Contractor shall file with the Engineer a written account that itemizes the actual cost of Extra Work. The Contractor shall allow the Engineer to have access to all of the Contractor's accounts, files, bills and vouchers that relate to the itemized actual costs of the Extra Work.

If the Contractor fails to file a written account for Extra Work within the time set forth in this paragraph, then the Contractor shall forfeit the right to be paid for the Extra Work.

No order for Extra Work shall in any manner or to any extent relieve the Contractor or his Surety of any obligation under the contract. All Extra Work orders given in accordance with the Agreement are a part of the Agreement and are subject to each and every term or requirement of the Agreement.

The Contractor is responsible for all damages caused by the carelessness or lack of skill of the Contractor, the subcontractors, or employees of the Contractor or subcontractor in doing Extra Work.

40. PROGRESS OF THE WORK

The Contractor shall provide an adequate force of labor and equipment to prosecute the Work to insure the Completion of the Work within the time limit for Completion as set forth in the Agreement.

If required by Owner or Engineer, the Contractor shall furnish a progress schedule to the Owner and Engineer in a form acceptable to the Engineer within ten (10) calendar days after the request is made. The Contractor shall provide all manpower and equipment necessary to meet the progress schedule. In the event periodic estimates indicate that the schedule progress is not being met, the Owner or Engineer may require the Contractor to furnish in writing to the Engineer the method the Contractor proposes to employ to bring the project into compliance with the progress schedule. The Owner may withhold payments if the Work is behind the progress schedule or otherwise not being performed in accordance with the terms of the Contract Documents.

49. PAYMENT

If the Contractor performs properly all of the obligations of the Contract Documents, the owner shall pay the Contractor for the performance of the Work in the manner and within the time specified in the Contract Documents. The Owner also agrees to pay the Contractor for Extra Work in accordance with the terms of the Contract Documents. The Contractor shall make requests for payment by submitting the original and four (4) copies of the monthly estimate for partial payment to the Owner on a form acceptable to the Owner, as set forth in Paragraph 51 of the General Conditions, entitled Monthly Estimates.

50. SALES AND USE TAXES

The Owner shall make no payment to the Contractor for sales or use tax that is not included in the Contract Price at the time the Agreement is executed by the Owner.

51. MONTHLY ESTIMATES AND RETAINAGE

On the 20th day of each month or at any other regular time agreed upon by the Owner and Contractor, the Contractor and the Inspector shall prepare and submit to the Owner a monthly estimate for Partial Payment. The monthly estimate shall cover items of work for which the Contractor is entitled to be paid since the last previous monthly estimate was submitted, including (1) the value of the Work done, (2) major items of equipment or materials delivered to the site of the project to be installed by the Contractor, as substantiated by submitted invoices and as approved by the inspector, and (3) materials incorporated into the Work.

The Owner shall pay to the Contractor all sums due under the monthly estimate less five percent (5%) retainage on or before the 15th day of the month following the submission of the monthly estimate, unless the Owner asserts a right to withhold some or all of the payment under the provisions of the Contract Documents.

The Contractor will be paid for materials delivered to and stored on the job site. Payment will be for actual cost of materials as evidenced by receipted invoices, less five percent (5%) retainage. The Contractor shall make a separate accounting of these materials and shall submit an accounting of them, with four (4) copies, along with the monthly estimate for partial payment.

52. PARTIAL PAYMENT NO WAIVER OF RIGHTS

Partial payments made under this Agreement by the Owner are not evidence of the proper performance of the Agreement by the Contractor either in whole or in part, and no payment made by the Owner shall be construed to be an acceptance of defective or improper work. No act of the Owner or the Engineer, or the representative of either of them, in superintending or directing

If an audit inspection or examination performed pursuant to this paragraph, discloses overcharges of any nature by the Contractor to the Owner in excess of five percent (5%) of the total billings made by the Contractors pursuant to the Contract Documents, the actual cost of the Owner's audit shall be paid by the Contractor.

56. WARRANTY PERIOD

The Contractor guarantees the quality and workmanship of the Work beginning on the date of Final Acceptance. The Warranty Period shall be one year, except that the Warranty Period for road work shall be three years or the period established by the Virginia Department of Transportation's latest requirements, whichever is longer.

57. NOTIFICATION TO PROPERTY OWNERS

Contractor shall properly notify all property owners two (2) weeks prior to the start of any construction (including land clearing). Notification shall be in the form of a letter similar to the "sample" reflected in the County's latest Water and Sewer Specifications. (See sample "NOTIFICATION" letter - Page NOT-1).

58. DRUG FREE WORKPLACE

During the performance of this contract, the contractor agrees to:

- A. Provide a drug-free workplace for the contractor's employees
- B. Post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition.
- C. State in all solicitations or advertisements for employees placed by or on behalf of the contractor that the contractor maintains a drug-free workplace.
- D. Include the provisions of the foregoing clauses in every subcontract or purchase order over \$10,000, so that the provisions will be binding upon each subcontractor or vendor.

For the purposes of this section, "drug-free workplace" means as site for the performance of work done in connection with a specific contract awarded to a contractor in accordance with this chapter, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the contract.

59. AWARD NOTIFICATION

For information pertaining to the award of this procurement transaction, bidders may access public notification electronically at www.co.chesterfield.va.us/ManagementServices/Purchasing/purchase.asp

60. UNBALANCED BIDS

The County reserves the right to negotiate unbalanced unit prices with the lowest bidder prior to award and to award to the next low bidder if a reasonable fee is not achieved.

61. ENVIRONMENTAL MANAGEMENT

Vendor/Supplier/Contractor will be responsible for complying with all federal, state and local environmental regulations relating to transportation, handling, storage, spillage and any other aspect of providing the services specified herein, as applicable.

62. FAITH-BASED ORGANIZATIONS

Chesterfield County does not discriminate against faith-based organizations in accordance with the Code of Virginia, Section 2.2-4343.1.

63. WATER LINE TIE-INS

All water line tie-ins to the existing distribution system including vertical and horizontal relocations shall be coordinated with the Operations and Maintenance Section of the Utilities Department. Tie-ins shall be scheduled Monday thru Thursday from 9:00 a.m. to 4:00 p.m. Tie-ins may be required outside of this time and/or during nighttime hours.

The County reserves the right to require the Contractor to perform tie-ins outside of the normal working hours detailed above in the interest of public safety or customer service. No claim for additional compensation shall be made by the Contractor when such occasions occur.

Proper preparation including field verification of the plans shall be accomplished to minimize shutdown time and prevent the tie-in from exceeding scheduled shutdown time. Sufficient personnel, equipment and materials shall be on site prior to the water being shut off. Where applicable, excavation and preassembling of fittings shall be performed. If, in the opinion of the inspector, sufficient resources are not available, the tie-in will be cancelled and rescheduled.

Tie-ins to asbestos cement pipe shall be made to rough barrel pipe. Tie-ins to the machined section of asbestos pipe will not be permitted. Where asbestos cement pipe couplings have been removed, the machined end of the pipe shall be removed. Abandonment of cement asbestos pipe shall be per state and federal requirements.

Tie-ins involving fittings shall include provisions for temporary blocking until concrete blocking has cured.

All pipe and fittings used for a tie-in are to be swabbed with a 1% chlorine solution prior to connection.

62. PROCEDURES FOR CLAIMS AND DISPUTES

A claim is a demand or assertion by the Contractor seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension of time or other relief with respect to the terms of the Contract. Claims must be initiated by written notice. The responsibility to substantiate claims shall rest with the Contractor.

Claims by the Contractor must be initiated within 21 days after occurrence of the event giving rise to such claim or within 21 days after the claimant first recognizes the condition giving rise to the claim, whichever is later. Claims must be initiated by written note to the Architect or Engineer and Owner. Submittal of a claim by the Contractor within the time limits prescribed by this paragraph shall be required as a condition precedent to the institution of litigation by the Contractor with respect to the subject matter of that claim.

NON-DISCRIMINATION & EQUAL EMPLOYMENT

In accordance with Section 2-48 of the Code of the County of Chesterfield, 1978, as amended, and Section 2.2-4311 of the Code of Virginia, 1950, as amended, all contracts over \$10,000 shall include the following provisions:

- A. During the performance of this Contract, the Contractor agrees as follows:
- (1) The Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex or national origin, except where religion, sex or national origin is a bona fide occupational qualification reasonably necessary to the normal operation of the Contractor. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.
 - (2) The Contractor, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, will state that such Contractor is an equal opportunity employer.
 - (3) Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation, shall be deemed sufficient for the purpose of meeting the requirements of this section.
- B. The contractor shall include the provisions of the foregoing paragraphs A(1), (2) and (3) in every subcontract or purchase order of over \$10,000, so that the provisions will be binding upon each subcontractor or vendor.

COUNTY NO. _____

CONTRACTOR

BY _____
(Signature)

NAME _____
(Typed or Printed)

TITLE _____

ADDRESS _____

(SEAL)

ATTEST:

(Secretary)

NAME _____
(Please Type)

(Affix Corporate Seal)

CHESTERFIELD COUNTY

BY _____
(Signature)

NAME _____
(Typed or Printed)

TITLE _____

(SEAL)

ATTEST:

NAME _____
(Please Type)

TITLE _____

COUNTY NO. _____

NOTICE OF AWARD

TO: _____

Re: Project Number _____

Project Name _____

Dear _____:

The Department of Public Utilities has reviewed the bid submitted by you for the above described work in response to its Advertisement for Bids dated _____, 20_____, and Information for Bidders. On _____, 20_____, the Board of Supervisors awarded this project to _____ in the amount of _____.

You are required by the Information for Bidders to execute the Agreement and furnish the required Contractor's Performance Bond, Payment Bond and Certificates of Insurance within fifteen (15) calendar days from the date of this notice to you.

If you fail to execute said Agreement and to furnish said Insurance Certificate (s) and Bond within fifteen (15) days from the date of this Notice, we may consider all your rights arising out of our acceptance of your Bid as abandoned and as a forfeiture of your Bid Bond. We will be entitled to such other rights as may be granted by law.

By copy of this letter, we are requesting that the Engineer submit to you five (5) copies of the Contract Documents for execution. We are also requesting that the Engineer send one (1) complete set of plans and specifications to the Construction Section for their use. After execution of the Contract Documents, please return to the Purchasing Department, attention Donna Clark.

Please acknowledge and return a copy of this Notice of Award within five (5) days from the date of this letter. Also, please include a signed copy of this notice in the five (5) contract documents being forwarded to you for execution.

COUNTY NO. _____

NOTICE TO PROCEED

DATE

TO: _____

Re: Project Number _____
Project Name _____

Dear _____:

You are hereby notified to commence WORK in accordance with the Agreement dated _____, 20_____, within ten(10) working days from the date of this letter, and you are to complete the WORK within _____consecutive calendar days thereafter. The date of the completion of all work is _____.

Prior to commencing work on _____, you are required to schedule a pre-construction meeting. This meeting may be scheduled by contacting the Utilities Department Construction Section at 796-7125.

Please acknowledge and return a copy of this Notice to Proceed within five (5) days from the date of this letter.

COUNTY OF CHESTERFIELD

By _____

Title _____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO
PROCEED is hereby acknowledged by

this the _____ day of
_____, 20_____

By _____

Title _____

COUNTY NO. _____

BONDS

A Bid Bond, made payable to the Owner, will be required of all Bidders in the amount specified in the "Instructions to Bidders".

A Labor and Material Payment Bond and a Performance Bond, each in the amount of 100% of the Contract Price, including additions or deductions, with a corporate surety authorized to do business in the State of Virginia and otherwise acceptable in all respects to the Owner's Attorney will be required for the faithful performance of the Contract. The Bonds shall be on the forms included in these Specifications. The Contractor shall show satisfactory evidence of compliance with all bond requirements before entering into any agreement to sublet any of the work to be done under this Contract. The bonds shall protect the Owner from claims from persons or firms performing labor or furnishing materials and from claims for damages, claims, losses or other expenses to the Owner, including any attorney's fees, arising from failure of the Contractor to perform the Contract, or to correct defective materials or workmanship. Such bonds shall remain in force for a period of at least twelve months after the completion and final acceptance of the project by the Owner. Executed copies of the Labor and Material Payment and Performance Bonds shall be bound with, and become a part of, all copies of the Contract. Prior to the issuance of any bond required by this Contract, the Contractor or Subcontractor shown as principal on the bond shall furnish the insurance company issuing the bond with a copy of the Contract.

Attorneys-in-fact who sign Bid Bonds, Labor and Material Payment Bonds and Performance bonds must file with each bond a certified and effective dated copy of their power of attorney. Each Bid Bond and the accompanying power of attorney should bear the same date. Each Labor and Material Payment Bond and each Performance Bond and the accompanying power of attorney should bear the same date as the date of the Contract.

The party to whom the Contract is awarded will be required to execute the Contract and obtain the Labor and Material Payment Bond and the Performance bond within fifteen calendar days from the date when the Notice of Award together with the Contract is delivered to the Bidder for execution. In case of the failure of the Bidder to execute the Contract within the prescribed time, the Owner may, at his option consider the Bidder in default, in which case the Bid Bond accompanying the Bid shall be forfeited as allowed by law.

LABOR AND MATERIAL
PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: That

(Name of Contractor)

(Address of Contractor)

a _____, hereinafter called Principal, and
(corporation, partnership or individual)

(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto _____

(Name of Owner)

(Address of Owner)

hereinafter called OWNER, in the penal sum of _____
_____ Dollars, (\$_____)

in lawful money of the United States, for the payment of which sum well
and truly to be made, we bind ourselves, successors, and assigns, jointly
and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas the Principal
intered into a certain contract with the OWNER, dated the ____ day
of _____ 20____, a copy of which is hereto attached and
made a part hereof, for the construction of:

NOW, THEREFORE, if the Principal shall promptly make payment to all
persons, firms, SUBCONTRACTORS, and corporations furnishing materials for
or performing labor in the prosecution of the WORK provided for in such
contract and any authorized extension or modification thereof, including
all amounts due for materials, lubricants, oil, gasoline, coal and coke,
repairs on machinery, equipment and tools, consumed or used in connection
with the construction of WORK, and all insurance premiums on said WORK,
and for all labor performed in such WORK whether by SUBCONTRACTOR or
otherwise, then this obligation shall be void; otherwise to remain in full
force and effect.

COUNTY PROJECT NO. _____

3.05 BLASTING

- A. Blasting operations shall be in strict accordance with "Rules and Regulations Governing Manufacture, Storage, Handling, Use and Sale of Explosives" issued by the Department of Labor and Industry of Virginia and any County ordinances. All blasting shall be done at the sole risk of the Contractor and shall be done only by experienced licensed personnel. Occupants of nearby structures shall be notified prior to beginning blasting operations.

- B. When blasting is required, the Contractor shall conform to the following requirements:
 - 1. Blasting will not be permitted before 9:00 A.M. or after 4:00 P.M. on Monday through Friday.
 - 2. Blasting on Saturdays, Sundays and holidays will not be permitted.
 - 3. The Contractor shall not be permitted to blast under any conditions unless a representative of the Owner is present.
 - 4. The Contractor shall, each day when necessary to blast, set up an approximate schedule of blasting operations, and provide 24 hours notice to the Owner, and property owners with occupied buildings within 1000 feet of blasting.
 - 5. The Contractor shall use mats to minimize noise impact on nearby residents.
 - 6. The County reserves the right to require the Contractor to have a repair crew and equipment available on-site to repair any damage caused to the Chesterfield County utility by blasting operations.

3.06 BACKFILL FOR TRENCHES

- A. General: After the installation of the pipe has been field inspected, the trenches shall be backfilled with fine, loose earth deposited carefully on both sides of the pipe or with the appropriate fill material as specified in the County's Standard Details Section. Large clods, frozen earth, sticks, stones, and other unsatisfactory material must be excluded from the backfill around and to 12" above the pipe. The fill or in the case of plastic pipe where stone is used for bedding and backfill to the top of the pipe, the stone shall be carefully rammed by hand or pneumatic tamping methods under, on both sides and on top of the pipe. The remainder of the backfilling may be done by hand or with mechanical equipment in lifts no greater than 12 inches. Where settlement occurs, the trench shall be refilled, contoured and compacted by an approved method to conform to the surface of the ground. Sheeting and bracing shall, in general, be removed as the backfilling progresses, and in such a manner

as to avoid the caving of the trench. Voids left by the withdrawal of the sheeting or shoring shall be carefully filled and rammed. Where in the opinion of the Owner, damage is liable to result from the withdrawal of the sheeting it shall be left in place. No rock should come in contact with pipe.

1. Sewer pipe shall have minimum bedding as shown on the County Standard Details.
 2. Backfill shall be compacted in layers with the following percentage of maximum density at optimum moisture content of $\pm 2\%$ as determined by ASTM D698.
 - a. 95 percent under pavements and road shoulders.
 - b. 90 percent in other unpaved areas.
- B. Under Existing Roadways and Pavement: Backfill for trenches under roadways and other paved areas shall be backfilled to the top with 21-A stone, except that all fill above the pipe shall be deposited in layers not exceeding 6 inches in thickness. Each lift shall be thoroughly compacted by mechanical or hand tamping methods, in accordance with VDOT requirements so that when the backfilling is completed, the paving may be replaced as specified in the section entitled Construction in Public Streets, Roads and Alleys.
- C. Clay dams: Clay material with an imperviousness of 10-3 cm/sec shall be used in clay dams. Material shall be compacted as indicated in paragraph A above. Inspector shall approve clay material prior to use.

3.07 BACKFILL FOR STRUCTURES

Around and adjacent to structures, backfill shall be of material of suitable stability and perviousness. Backfill shall be placed in 6 inch lifts, each lift being compacted by an approved method. No backfill shall be placed against a structural wall until all connecting structural members are in place. It shall be the Contractor's responsibility to provide compaction to 95% per ASTM D-698. The Contractor shall provide adequate protection to all structures during backfilling and use every precaution to avoid damaging or defacing them.

3.08 CONSTRUCTION IN PUBLIC STREETS, ROADS AND ALLEYS

Unless superseded by other specifications or VDOT permit requirements the following shall apply: The Contractor's operations in public streets, roads or alleys, shall be confined to as small a space as is practicable, so as not to cause undue inconvenience to the public or abutting properties, and shall be subject at all times to the approval of the County and Virginia Department of Transportation (VDOT). The word VDOT used in the previous sentence means the individual, group or governmental body that has jurisdiction over the streets, roads and alleys. Unless otherwise directed by VDOT, the Contractor shall perform the proposed construction on public streets, roads and alleys as follows:

GENERAL: Typically, water and sewer lines are to cross roadways at right angles and/or to parallel roadways in the roadway or along side the roadway. Uncased water lines are to be designed to have sufficient strength to withstand dead loads and superimposed live loads. All restoration materials and workmanship shall conform to the latest edition of the "Virginia Department of Transportation Road and Bridge Specifications" in addition to permit requirements. The contractor is responsible for obtaining all highway permits and forwarding a copy to the County or obtain a VDOT statement that no highway permit is necessary before construction can begin. Method of construction (trenching, boring, tunneling, jacking, etc.) must be shown on permit and plans. During construction, if deemed necessary by the VDOT to assign inspectors to the project, the contractor is to pay an additional inspection fee to cover their cost. The contractor is responsible for identifying, locating, adjusting and/or relocating existing utilities, structures and survey markers (including making all the arrangements necessary to coordinate the work to be performed). To avoid unnecessary construction delays, the contractor needs to make application for a highway permit at least 10 working days prior to starting construction.

Nothing contained herein is intended, nor should be construed, to relieve the contractor in any manner whatsoever of his responsibility for maintaining trenches, pavement structure, shoulders and generally the work site in a manner acceptable to VDOT. Prior to the actual open cut, the VDOT is to be notified 24 hours in advance to arrange a meeting with their representative and the Utilities Inspector.

BACKFILL AND COMPACTION: Typically, backfill will be compacted to 95% of the theoretical maximum density at optimum moisture content, as determined by VDOT testing procedure VTM-1. The contractor shall provide adequate protection to all structures during trenching and backfilling using every precaution to avoid damage or defacement. Not over 500 feet of trench shall be opened at any one time. Backfill for water and sewer lines shall be placed generally in accordance with VDOT and County specifications and the following criteria:

- A. Prior to excavation of the trench and prior to the installation of surface course(s), the adjacent plant mix shall be smooth face cut through the full depth.
- B. No trench shall be backfilled until authorized by the County. Materials for backfilling from the bottom (Bedding per County Standards) of the trench to 12 inches above the water and/or sewer line shall be #57 stone bedding and backfill for sewer lines and VDOT Type B or approved sand for water lines. Material shall be thoroughly and carefully compacted to insure a sound backfill over and around the water and/or sewer line.
- C. Backfill shall be compacted by mechanical tamping throughout the depth of the trench in 6" layers to insure a suitable sub base, acceptable to the County and VDOT.

- D. Backfilling shall be performed in accordance with the standard details, latest revision, for pavement restoration applicable to the situation at hand.

BITUMINOUS PAVEMENT STRUCTURE: Wherever pavement is permitted to be cut as shown on plans, not over one-half of the road width shall be disturbed at one time, unless an approved method of detouring traffic is reviewed and accepted by Virginia Department of Transportation. The first opening shall be in travelable condition before the second half can be opened.

Where contractor is granted approval from VDOT to open cut a road, **(this applies to crossings only)** the permit will include the following stipulations but not limited thereto:

- A. Chesterfield Residency is to be notified 48 hours prior to any open cut work being performed.
- B. Work within the roadway shall be done between the hours of **9 A.M. and 4 P.M.** or as stated in the VDOT permit.
- C. Utilize proper sign layout and channelization devices (i.e., cones, plastic barrels, pavement marking, etc.) during construction, according to VDOT's "Virginia Work Area Protection Manual".
- D. The area of the open cut shall be restored in accordance with one of the following applicable standards:

1. **Asphalt Road**

- a. Backfill entirely with #21-A or #21 stone (95% compaction)
- b. Apply tack material to all joints, before placing surface mixture
- c. Install minimum 12" BM-25.0 asphalt concrete in 4" lifts (see Standard Detail)
- d. Overlay a minimum of 25' on both sides of trench with 2" of surface mix
- e. Seal all joints with liquid bituminous sealer

2. **Asphalt Road Base with a Surface Treatment Seal**

- a. Backfill entirely with #21-A or #21-B stone (95% compaction)
- b. Apply tack coat for all edges and existing surface asphalt (see Standard Detail)

- c. Install 1.5 times the thickness of existing pavement or a minimum of 6" BM-2 (base mix) flush with existing pavement
- d. Surface treat a minimum of 10' on both sides of trench with blotted seal coat type C: the initial seal and final seal shall conform to the requirements of AASHTO M208 @ 0.17 gals./sq. yd. with 15 lbs. of No. 8P stone/sq. yd. each.

3. Surface Treated Road (Tar and Gravel)

- a. Backfill entirely with #21-A or #21-B stone (95% compaction)
- b. Apply tack coat for all edges and existing surface asphalt (see Standard Detail)
- c. Install 4" of BM-2 (base mix) in trench flush with existing pavement
- d. Surface treat a minimum of 10' on both sides of trench with blotted seal coat type C: the initial seal and final seal shall conform to the requirements of AASHTO M208 @ 0.17 gals./sq. yd. with 15 lbs. of No. 8P stone/sq. yd. each.

4. Dirt/Gravel Road or Aggregate Shoulders

- a. Select backfill compacted to 95% maximum density (6" lifts)
- b. Backfill trench with 10" of #21-A or #21-B stone (95% compaction)
- c. Apply fresh application of #21-A or #21-B stone to all disturbed areas of the road

E . The pavement cut shall be covered with a temporary or permanent asphalt patch on the same day that excavation is made.

F. One travel lane will be maintained at all times.

Where the contractor is granted approval to open cut the road for parallel installation within the pavement and service crossings, pavement replacement shall be in accordance with the PAV Details as reflected in Part II of this document and VDOT permit.

SECTION 5

WATER DISTRIBUTION SYSTEM

I - GENERAL

1.01 RELATED DOCUMENTS

The general provisions of the Contract, including General and Supplementary Conditions and General Requirements apply to the work specified in this Section. Work accomplished under this Section shall be in accordance with the County standard details (Part II of this document).

1.02 DESCRIPTION OF WORK

- A. Contractor shall provide all labor, equipment, tools, services, and materials necessary for, or incidental to, the construction of the water distribution system, in conformance with, but not limited to, the following:
 - 1. All trenching, excavation, backfilling as stated herein or shown on the drawings.
 - 2. Setting new pipe inverts and other appurtenances to the proper location and invert elevations as shown on the Plans or approved cut sheets.
 - 3. Testing all utility piping systems as applicable and stated herein.
 - 4. In general all proposed utility systems as covered in this Section will be installed in the confines of the site as noted on the Plans.
- B. Related Work Specified Elsewhere: Site clearing, trenching, backfilling, and compaction.

1.03 REQUIREMENTS OF REGULATORY AGENCIES

Construction as shown on the Plans or stated herein shall be performed in accordance with current and applicable requirements as established by the County of Chesterfield, the Virginia Department of Health, or any other agencies having jurisdiction. Where conflicts arise between the Contract Documents and previously mentioned requirements, the more restrictive shall apply. If such requirements shall require a change in the work as stated herein or shown on the plans, the Contractor shall stop work and notify the Owner for further direction.

II - PRODUCTS

2.01 APPROVED MATERIALS

All materials shall conform to the County of Chesterfield "Approved Materials and Manufacturers" list with latest revision date. Contractor shall follow guidelines as established in the General Conditions of this document under Shop Drawings. All materials shall be virgin material.

III - EXECUTION

3.01 INSTALLATION OF NEW WATER SYSTEMS

A. Excavating and Backfilling:

1. Contractor shall do all excavating of any and all materials encountered in the course of excavating for all underground utility systems. After the pipe is in place, backfill with suitable material free from frozen earth, rocks, organic material, etc.
 - a. Provide all necessary shoring required for the protection of excavations, existing utilities and workmen and do all necessary pumping required to keep excavation and pipe free of water from any source at all times.
 - b. Provide sufficient barricades, etc., adjacent to excavations to safeguard against injury to workmen and the public. Provide and maintain sufficient warning lanterns at walks, roadways, and parking areas to provide safety at all times.
 - c. Where roots of live trees are encountered in excavations, they shall be carefully protected during construction.
 - d. Exercise special care in backfilling trenches to guard against disturbing the joint.
 - e. Remove and dispose of any material not used for backfill.
2. Removal of subsurface obstructions which are uncovered during excavation for installation of the water systems shall be removed by the Contractor at his expense. This shall include removal of existing concrete or brick of existing building foundations, footings, abandoned utility piping, wires, structures, rock boulders, etc., which may not be visible from surface investigations before construction, but will interfere with new installations. If such obstructions are encountered they shall be removed two feet from around the area of new facility and backfilled with a suitable material as specified.

B. Pipe Installation:

1. Take all precautions to insure that pipe and related items are not damaged in unloading, handling and placing in trench. Examine each piece of material just prior to installation to determine that no damage has occurred. Remove any damaged material from the site and replace with undamaged materials.

2. Keep pipe clean. Exercise care to keep foreign material and dirt from entering pipe during storage, handling and placing in trench. Contractor shall be responsible for plugging or capping line at the end of each day.
3. Do not lay pipe when weather or trench conditions are unsuitable.
4. Line and grade hubs shall be set by a registered surveyor at intervals to accurately insure proper location of water line and appurtenances. This shall include finished grade centerline stakes for fire hydrants, stakes at all fittings, referencing all property pins, etc. Cut sheets are required where the water line is to be laid to a grade according to the profiles in the plans, or where the future road grade is not yet to within 6" of its final location.
5. Water Pipe Laying:
 - a. Laying of water pipe shall be accomplished only after the trench has been dewatered and the foundation and/or bedding has been prepared. Mud, silt, gravel, and other foreign material shall be kept out of the pipe and off the jointing surfaces.
 - b. All pipe laid shall be retained in position so as to maintain alignment and joint closure until sufficient backfill has been completed to adequately hold the pipe in place. All pipe shall be laid to conform to the prescribed line and grade shown on the plans and this shall include digging out for bell ends.
 - c. Water pipe runs intended to be laid straight shall be so laid. Deflection from a straight line may be made by deflecting the joints only when permission has been given by the Engineer or Inspector. Joint deflection shall not exceed one-half that recommended by AWWA Standards or the manufacturer whichever is less. Changes in grade or alignment which cannot be made by deflecting pipe joints shall be made by use of proper bends, offsets or special fittings as required.
 - d. The water pipe, unless otherwise approved by the Owner, shall be laid up grade from point of connection of the existing water line or from a designated starting point. Water pipe shall be installed with the bell end forward or upgrade. When pipe laying is not in progress the forward end of the pipe shall be kept tightly closed with a water tight plug or cap, plywood or plastic is not acceptable.

- e. The pipe shall be fitted and matched so that when laid in the work, units will form a smooth, uniform invert.
- f. Prior to joining the pipe, all surfaces of the pipe to be joined and the surfaces of factory made jointing materials shall be clean and dry. Approved lubricants, primers, adhesives, etc., shall be applied and the pipes joined as recommended by the manufacturer's specifications. Sufficient pressure shall be applied in making the joint to assure that the pipe is "home". The interior of the pipe shall be cleaned of all foreign material as the work progresses. At the end of the work day, the last pipe laid shall be blocked to prevent creep, and closed with a water tight plug or cap.
- g. Joining Pipe:
 - 1) Ductile iron pipe to be joined as follows:
 - a) Mechanical joint pipe
 - (1) When installing PVC pipe into M.J. fittings, the beveled end of the pipe must be cut off to allow for maximum insertion depth and sealing area to avoid leaks. An approved joint restraint device is required when inserting PVC into MJ fittings. This device does not replace the requirements for a joint restraint system. Thoroughly clean inside of the bell and 8 inches of the outside of the spigot end of the joining pipe to remove oil, grit, excess coating and other foreign matter from the joint. Lubricate the bell and spigot end of the pipe, using only approved lubricant (Blue Lube or Slikstyx). (Note: Use of any unapproved lubricant other than Blue Lube or Slikstyx has been shown to cause significant taste and odor conditions when used in drinking water disinfected with chloramines. The County will not accept completed water lines that exhibit taste and odor conditions as a result of the use of unapproved lubricants.) Slip cast-iron gland on spigot end with

lip extension of gland toward end of pipe. Lubricate rubber gasket with approved lubricant referenced above and place on the spigot end with thick edge toward the gland.

- (2) Push the spigot end forward to seat in the bell. Then carefully press the gasket into the bell so that is located evenly around the joint. The gland is moved into position, bolts inserted and nuts screwed on finger tight, then tighten all nuts to torque listed below.

Bolts Size Inches	Torque-Ft.Lbs.		
5/8	40	-	60
3/4	60	-	90
1	70	-	100
1 1/4	90	-	120

- (3) Tighten nuts on alternate sides of the gland until pressure on the gland is equally distributed and torque value is reached.
- (4) Permissible deflection in mechanical joint pipe shall not be greater than one-half the maximum amount allowed in AWWA C600.

b) Push-on joint Ductile Iron pipe

- (1) Thoroughly clean inside of the bell and 8 inches of the outside of the spigot end of the joining pipe to remove oil, grit, excess coating, and other foreign matter. Flex rubber gasket and insert in the gasket recess of the bell socket. Apply a thin film of approved gasket lubricant (Blue Lube or Slikstyx), to the gasket and the spigot end of the joining pipe. (Note: Use of any unapproved lubricant other than Blue Lube or Slikstyx has been shown to cause significant taste and odor conditions when used in drinking water disinfected with chloramines. The County will not accept completed water lines that exhibit taste and odor conditions as a result of the use of unapproved lubricants.)

- (2) Start spigot end of pipe into socket with care. The joint shall then be completed by forcing the plain end to the bottom of the socket with a forked tool or jack type device. Field cut pipe shall have the end filed to match the manufactured spigot end.
 - (3) Permissible deflection in push-on joint pipe shall not be greater than 1/2 of that listed in AWWA C600.
- 2) Polyvinyl chloride (PVC) pipe shall be joined in accordance with the manufacturer's recommendations.

Polyvinyl Chloride (PVC) Push-on Joint Pipe

- a) Thoroughly clean inside of the bell and 1" beyond the reference mark on the spigot end of the joining pipe. Make certain the ell and rubber gasket have no foreign material that could interfere with the proper assembly of the pipe spigot.
- b) Lubricate the gasket and spigot end of the pipe, using only approved lubricant (Blue Lube or Slikstyx). (Note: Use of any unapproved lubricant other than Blue Lube or Slikstyx has been shown to cause significant taste and odor conditions when used in drinking water disinfected with chloramines. The County will not accept completed water lines that exhibit taste and odor conditions as a result of the use of unapproved lubricants.)
- c) Insert the spigot end into the bell. Align the pipe sections and push the spigot end in until the reference mark on the spigot end is flush with the end of the bell. Use a bar and block of wood to push pipe home.
- d) Field cut pipe shall be square cut and beveled to insure proper assembly. Use a factory finished beveled end as a guide to produce an equivalent angle and length of taper.

3) Asbestos Cement Transition:

- a) When connecting PVC or Ductile Iron pipe to existing asbestos cement pipe, the transition coupling is to be applied to the rough barrel of the asbestos cement pipe and not to a factory or machined end of the asbestos cement pipe.
- h. A tracing wire of 14 gauge copper shall be installed and taped directly on top of the pipe in a manner that a continuous tract results. Wire is to be wrapped around hydrants, blow offs and corporation stops.
- i. Place underground warning tape directly above all water mains, 18" below finished grade. Tape shall be polyethylene tape with a metallic core, 2 inches in width, with the continuous printed message "Caution Waterline Buried Below." Tape shall be Catalog No. 2 WAT as manufactured by the Seton Name Plate Corp. or approved equal.

C. Installation of Valves, Fittings, and Hydrants:

- 1. General: Valves, fittings and hydrants shall be set and jointed to the piping system as hereinbefore specified for cleaning, laying and jointing pipe.
- 2. Valves and Valve Boxes: Cast iron valve boxes shall be firmly supported, centered and plumb over the operating unit of valve. Box cover shall be set flush with the surface of finished pavement or at such other level as may be directed by the Owner. Valve rod extension with guide shall be required to maintain a distance of 2'-4' from operating nut to top of box. All valves shall be properly restrained.
- 3. Valve Key Extensions: Valve stem extensions shall be required where the valve-operating nut is installed at a depth greater than four feet (4').
- 4. Cross Connections: Drainage branches or blowoffs shall not be connected to any sewer, submerged in any stream or installed in any manner which, in the opinion of the Owner, will constitute a contamination hazard, or cross connection.
- 5. Hydrants: Connection to Main: Each hydrant shall be restrained and connected to the main with a minimum 6 inch branch, controlled by an independent 6 inch gate or resilient seat valve. Setting of Hydrants: When hydrants are set, a drainage pit two feet in diameter and two feet below the bowl of the hydrant shall be excavated. Valves: All valves shall be restrained with a hydrant tee.

The pit shall be filled with coarse gravel or #57 clean stone, mixed with coarse sand, to a level of 6 inches above the weep hole. No hydrant drainage pit shall be connected to a sewer. The bowls of all hydrants shall be well braced against unexcavated earth with suitable concrete backing, and when directed shall be restrained to the pipe with approved harnessing. All hydrants shall be thoroughly cleaned of dirt or foreign matter before setting.

6. Anchorage of Fittings: As required in Part V, Section 4 of this document, all fittings i.e., each bend, tee, plug, valve and cap shall be prevented from moving by means of adequate thrust reaction blocking or mechanical restraints; or both.
7. In easements and undeveloped wooded areas, plastic markers shall be installed every 200 feet, and at all valves and fittings. Markers shall be as manufactured by Carsonite or approved equal. Exceptions are where water lines are installed in "kept" yards where the property owners may object to the placement of these markers. Contractors will be required to properly install the markers per manufacturer's recommendations, parallel to the water line facing roadway, or as additionally directed by the County.

D. Installation of Fabricated Steel Tapping Sleeves:

1. General: Rigorous testing and conditions relating to tapping sleeves, applied to all manufacturers, will become our standard operating procedure. These conditions are as follows:
 - a. The tapping sleeve shall be tested in place to a minimum of 200 psi, for a minimum of 10 minutes with no loss of pressure.
 - b. If the sleeve fails the 200 psi pressure test, the original failed sleeve shall be replaced with an entirely new sleeve.
 - c. Tapping sleeves 16" and above shall be supported by a concrete pedestal support, as shown in the County's "Standard Details" Section.
2. Rockwell Tapping Sleeve: In addition to the conditions outlined in Section 1 above, the following procedures must be adhered to be followed by the contractor:
 - a. Clean pipe surface thoroughly, particularly in the area where the gasket will seal. The contractor shall wipe the pipe in the area where the tap is to be made with a 1% chlorine solution prior to installing the sleeve.

EDITION 3

ADDENDUM #1

NEW PAGES

TO BE INSERTED INTO

PART IV

OF

CHESTERFIELD COUNTY

WATER AND SEWER

SPECIFICATIONS

PLEASE THROW THIS SHEET AWAY WHEN INSERTING NEW PAGES INTO BOOK.

GENERAL CONDITIONS

1. GENERAL:

- A. Construction will not be allowed to begin until all criteria of the design review process have been satisfied and permission has been granted by the County's Utilities Construction Section. If construction begins prior to permission being granted, the County reserves the right to require the contractor to uncover and/or remove unauthorized work.
- B. At the option of the Inspection Section, a preconstruction meeting may be required. Prior to beginning work, at least 48 hours advance notice must be given to the Inspection Section. Notification shall be given to the Principal Engineer at 748-1576.
- C. Where applicable, three copies of construction "cut-sheets" shall be submitted to the Utilities Department prior to the beginning of construction. "Cut-sheets" shall show centerline and offset hub elevations and amount of cut. Cut sheets are required on all gravity and force main wastewater projects, on water line projects where the final grade on future roads and paved areas can not be determined, and on projects where lines are installed in easements. Cut sheets are to be prepared by a qualified engineer or surveyor. Cut sheets shall consist of the following information:
 - 1) Temporary bench marks at each manhole.
 - 2) Each downgrade manhole is to begin with station 0+00 to readily identify the station of each service connection.
 - 3) Where the County is participating in the cost, elevations on centerline cuts are required every 25 feet.
 - 4) Centerline elevations every 50 feet and at every valve box and manhole location for water line projects where cut sheets are permitted and for force main projects.
- D. The Contractor shall be required to have all erosion and sediment control measures in place and approved before beginning clearing or construction.
- E. The Contractor is reminded of the requirements of permits issued by Chesterfield County, the Virginia Department of Transportation and other agencies and the obligation that the requirements of these permits be strictly adhered to.
- F. The Contractor is reminded that prior to the installation of water mains, the design engineer must certify in writing that:
 - 1) All pavement and shoulder areas within the right-of-way are graded to within 6" of subgrade.

4. The Contractor shall, each day when necessary to blast, set up an approximate schedule of blasting operations, and provide 24 hours notice to the County, and property owners with occupied buildings within 1000 feet of blasting.
5. The Contractor shall use mats to minimize noise impact on nearby residents.
6. The County reserves the right to require the Contractor to have a repair crew and equipment available on-site to repair any damage caused to the Chesterfield utility by blasting operations.

3.06 BACKFILL FOR TRENCHES

- A. General: After the installation of the pipe has been field inspected, the trenches shall be backfilled with fine, loose earth deposited carefully on both sides of the pipe or with the appropriate fill material specified on the trench detail or the County's Standard Details Section. Large clods, sticks, stones, and other unsatisfactory material must be excluded from the backfill around and to 12" above the pipe. The fill or in the case of plastic pipe where stone is used for bedding and backfill to the top of the pipe, the stone shall be carefully rammed by hand or pneumatic tamping methods under, on both sides and to within 2-3 feet on top of the pipe. The remainder of the backfilling may be done by hand or with mechanical equipment in lifts no greater than 12 inches. Where settlement occurs, the trench shall be refilled, contoured and compacted by an approved method to conform to the surface of the ground. Sheeting and bracing shall, in general, be removed as the backfilling progresses, and in such a manner as to avoid caving of the trench. Voids left by the withdrawal of the sheeting or shoring shall be carefully filled and rammed. Where in the opinion of the County, damage is liable to result from the withdrawal of the sheeting, it shall be left in place. No rock should come in contact with pipe.
1. Sewer pipe shall have minimum bedding as shown on the County Standard Details.
 2. Backfill shall be completed in layers with the following percentage of maximum density at optimum moisture content of $\pm 2\%$ as determined by ASTM D698.
 - a. 95 percent under pavements and road shoulders.
 - b. 90 percent in other unpaved areas.

their cost. The contractor is responsible for identifying, locating, adjusting and/or relocating existing utilities, structures and survey markers (including making all the arrangements necessary to coordinate the work to be performed). To avoid unnecessary construction delays, the contractor needs to make application for a highway permit at least 10 working days prior to starting construction.

Nothing contained herein is intended, nor should be construed, to relieve the contractor in any manner whatsoever of his responsibility for maintaining trenches, pavement structure, shoulders and generally the work site in a manner acceptable to VDOT. Prior to the actual open cut, the VDOT is to be notified 24 hours in advance to arrange a meeting with their representative and the Utilities Inspector.

BACKFILL AND COMPACTION: Typically, backfill will be compacted to 95% of the theoretical maximum density at optimum moisture content, as determined by VDOT testing procedure VTM-1. The contractor shall provide adequate protection to all structures during trenching and backfilling using every precaution to avoid damage or defacement. Not over 500 feet of trench shall be opened at any one time. Backfill for water and sewer lines shall be placed generally in accordance with VDOT and County specifications and the following criteria:

- A. Prior to excavation of the trench and prior to the installation of surface course(s), the adjacent plant mix shall be smooth face cut through the full depth.
- B. No trench shall be backfilled until authorized by the County. Materials for backfilling from the bottom (Bedding per County Standards) of the trench to 12 inches above the water and/or sewer line shall be #57 stone bedding and backfill for sewer lines and VDOT Type B or approved sand for water lines. Material shall be thoroughly and carefully compacted to insure a sound backfill over and around the water and/or sewer line.
- C. Backfill shall be compacted by mechanical tamping throughout the depth of the trench in 6" layers to insure a suitable subbase, acceptable to the County and VDOT.
- D. Backfilling shall be performed in accordance with the standard details, latest revision, for pavement restoration applicable to the situation at hand.

BITUMINOUS PAVEMENT STRUCTURE: Wherever pavement is permitted to be cut as shown on plans, not over one-half of the road width shall be disturbed at one time, unless an approved method of detouring traffic is reviewed and accepted by Virginia Department of Transportation. The first opening shall be in travelable condition before the second half can be opened.

Where contractor is granted approval from VDOT to open cut a road, (**this applies to crossings only**) the permit will include the following stipulations but not limited thereto:

- A. Chesterfield Residency is to be notified 48 hours prior to any open cut work being performed.
- B. Work within the roadway shall be done between the hours of **9 A.M. and 4 P.M.** or as stated in the VDOT permit.
- C. Utilize proper sign layout and channelization devices (i.e., cones, plastic barrels, pavement marking, etc.) during construction, according to VDOT's "Virginia Work Area Protection Manual".
- D. The area of the open cut shall be restored in accordance with one of the following applicable standards:

1. **Asphalt Road**

- a. Backfill entirely with #21-A or #21 stone (95% compaction)
- b. Apply tack material to all joints, before placing surface mixture
- c. Install minimum 12" BM-25.0 asphalt concrete in 4" lifts (see Standard Detail)
- f. Overlay a minimum of 25' on both sides of trench with 2" of surface mix
- g. Seal all joints with liquid bituminous sealer

2. **Asphalt Road Base with a Surface Treatment Seal**

- a. Backfill entirely with #21-A or #21-B stone (95% compaction)
- b. Apply tack coat for all edges and existing surface asphalt (see standard detail)
- c. Install 1.5 times the thickness of existing pavement or a minimum of 6" BM-2 (base mix) flush with existing pavement
- d. Surface treat a minimum of 10' on both sides of trench with blotted seal coat type C: The initial seal and final seal shall conform to the requirements of AASHTO M208 @ .17 gal./sq.yd. with 15 lbs. of No. 8P stone per sq. yd. each.

When the pressure has stabilized and is at or above the starting test pressure of 3.5 psi gage, commence the test. Before starting the test, the pressure may be allowed to drop to 3.5 psig. Record the drop in pressure for the test period. If the pressure has dropped more than 1.0 psi gage during the test period, the line shall be presumed to have failed. The test may be discontinued when the prescribed test time has been completed even though the 1.0 psig drop has not occurred.

The test procedure may be used as a presumptive test which enables the installer to determine the acceptability of the line prior to backfill and subsequent construction activities.

If the pipe to be tested is submerged in ground water, the test pressure shall be increased by 1.0 psi for every 2.31 feet the ground water level is above the invert of the sewer.

- e. Safety: The air test may be dangerous if, because of lack of understanding or carelessness, a line is improperly prepared.

It is extremely important that the various plugs be installed and braced in such a way as to prevent blowouts. In as much as a force of 250 lb. is exerted on an 8 inch plug by an internal pipe pressure of 5 psi, it should be realized that sudden expulsion of a poorly installed plug or of a plug that is partially deflated before the pipe pressure is released can be dangerous.

As a safety precaution, pressurized equipment shall include a regulator or relief valve set at no more than 10 psi to avoid over-pressurizing and damaging an otherwise acceptable line. No one shall be allowed in the manholes during testing.

- 3. All manholes will be tested using the negative air pressure test (vacuum) in accordance with ASTM C 1244-93 or latest edition for watertightness, and manhole will be visually inspected after backfilling. Contractor may backfill before testing with the understanding that any repairs will be made from the exterior of the manhole.

- a. Provide all necessary shoring required for the protection of excavations, existing utilities and workmen and do all necessary pumping required to keep excavation and pipe free of water from any source at all times.
 - b. Provide sufficient barricades, etc., adjacent to excavations to safeguard against injury to workmen and the public. Provide and maintain sufficient warning lanterns at walks, roadways, and parking areas to provide safety at all times.
 - c. Where roots of live trees are encountered in excavations, they shall be carefully protected during construction.
 - d. Exercise special care in backfilling trenches to guard against disturbing the joint.
 - e. Remove and dispose of any material not used for backfill.
2. Removal of subsurface obstructions which are uncovered during excavation for installation of the water systems shall be removed by the Contractor at his expense. This shall include removal of existing concrete or brick of existing building foundations, footings, abandoned utility piping, wires, structures, rock boulders, etc., which may not be visible from surface investigations before construction, but will interfere with new installations. If such obstructions are encountered they shall be removed two feet from around the area of new facility and backfilled with a suitable material as specified.

B. Pipe Installation:

1. Take all precautions to insure that pipe and related items are not damaged in unloading, handling and placing in trench. Examine each piece of material just prior to installation to determine that no damage has occurred. Remove any damaged material from the site and replace with undamaged materials.
2. Keep pipe clean. Exercise care to keep foreign material and dirt from entering pipe during storage, handling and placing in trench. Contractor shall be responsible for plugging or capping line at the end of each day.
3. Do not lay pipe when weather or trench conditions are unsuitable.
4. Line and grade hubs shall be set by a registered surveyor at intervals to accurately insure proper

location of water line and appurtenances. This shall include finished grade centerline stakes for fire hydrants, stakes at all fittings referencing all property pins, etc. Cut sheets are required where the water line is to be laid to a grade according to the profiles in the plans, or where the future road grade is not yet to within 6" of its final location.

5. Water Pipe Laying:

- a. Laying of water pipe shall be accomplished only after the trench has been dewatered and the foundation and/or bedding has been prepared. Mud, silt, gravel, and other foreign material shall be kept out of the pipe and off the jointing surfaces.
- b. All pipe laid shall be retained in position so as to maintain alignment and joint closure until sufficient backfill has been completed to adequately hold the pipe in place. All pipe shall be laid to conform to the prescribed line and grade shown on the plans and shall include digging out for bell ends.
- c. Water pipe runs intended to be laid straight shall be so laid. Deflection from a straight line may be made by deflecting the joints only when permission has been given by the County. Joint deflection in pipe shall not exceed one-half that recommended by AWWA Standards or the manufacturer whichever is less. Changes in grade or alignment which cannot be made by deflecting pipe joints shall be made by use of proper bends, offsets or special fittings as required.
- d. The water pipe, unless otherwise approved by the Inspector, shall be laid up grade from point of connection of the existing water line or from a designated starting point. Water pipe shall be installed with the bell end forward or upgrade. When pipe laying is not in progress, the forward end of the pipe shall be kept tightly closed with a water tight plug or cap, plywood or plastic is not acceptable.
- e. The pipe shall be fitted and matched so that when laid in the work, units will form a smooth, uniform invert.
- f. Prior to joining the pipe, all surfaces of the pipe to be joined and the surfaces of factory made jointing materials shall be clean and dry. Approved lubricants, primers, adhesives, etc., shall be applied and the pipes joined as recommended by the manufacturer's specifications.

Sufficient pressure shall be applied in making the joint to assure that the pipe is "home".

The interior of the pipe shall be cleaned of all foreign material as the work progresses. At the end of the work day, the last pipe laid shall be blocked to prevent creep, and closed with a water tight plug or cap.

g. Joining Pipe:

1) Ductile iron pipe to be joined as follows:

(a) Mechanical point pipe

(1) When installing PVC pipe into M.J. fittings, the beveled end of the pipe must be cut off to allow for maximum insertion depth and sealing area to avoid leaks. An approved joint restraint device is required when inserting PVC pipe into M.J. fittings. This device does not replace the requirements for a joint restraint system. Thoroughly clean inside of the bell and 8 inches of the outside of the spigot end of the joining pipe to remove oil, grit, excess coating and other foreign matter from the joint. Lubricate the bell and spigot end of the pipe, using only approved lubricant (Blue Lube or Slikstyx). (Note: Use of any unapproved lubricant other than Blue Lube or Slikstyx has been shown to cause significant taste and odor conditions when used in drinking water disinfected with chloramines. The County will not accept completed water lines that exhibit taste and odor conditions as a result of the use of unapproved lubricants.) Slip cast-iron gland on spigot end with lip extension of gland toward end of pipe. Lubricate rubber gasket with approved lubricant as referenced above and place on the spigot end with thick edge toward the gland.

(2) Push the spigot end forward to seat in the bell. Then carefully press the gasket into the bell so

that it is located evenly around the joint. The gland is moved into position, bolts inserted and nuts screwed up finger tight, then tighten all nuts to torque listed below.

Bolts Size Inches	Torque-Ft. Lbs.
?	40 - 60
$\frac{3}{4}$	60 - 90
1	70 - 100
1 1/4	90- 120

- (3) Tighten nuts on alternate sides of the gland until pressure on the gland is equally distributed, and torque value is reached.
- (4) Permissible deflection in mechanical joint pipe shall not be greater than one-half of that listed in AWWA C600.

(b) Push-on point Ductile Iron pipe

- (1) Thoroughly clean inside of the bell and 8 inches of the outside of the spigot end of the joining pipe to remove oil, grit, excess coating, and other foreign matter. Flex rubber gasket and insert in the gasket recess of the bell socket. Apply a thin film of gasket lubricant (Blue Lube or Slikstyx), to the gasket and spigot end of the joining pipe. (Note: Use of any unapproved lubricant other than Blue Lube or Slikstyx has been shown to cause significant taste and odor conditions when used in drinking water disinfected with chloramines. The County will not accept completed water lines that exhibit taste and odor conditions as a result of the use of unapproved lubricants.)
- (2) Start spigot end of pipe into socket with care. The joint shall then be completed by forcing the plain end to the bottom of the socket with a forked tool or jack type device. Field cut pipe shall have the end filed to match the manufactured spigot end.
- (3) Permissible deflection in push-on joint pipe shall not be greater

than one-half of that listed in
AWWA C600.

- 2) Polyvinyl chloride (PVC) pipe shall be joined in accordance with the manufacturer's recommendations.

Polyvinyl Chloride (PVC) Push-on Joint Pipe

- a) Thoroughly clean inside of the bell and 1" beyond the reference mark on the spigot end of the joining pipe. Make certain the bell and rubber gasket have no foreign material that could interfere with the proper assembly of the pipe spigot.
- b) Lubricate the gasket and spigot end of the pipe, using only approved lubricant (Blue Lube or Slikstyx). (Note: Use of any unapproved lubricant other than Blue Lube or Slikstyx has been shown to cause significant taste and odor conditions when used in drinking water disinfected with chloramines. The County will not accept completed water lines that exhibit taste and odor conditions as a result of the use of unapproved lubricants.)
- c) Insert the spigot end into the bell. Align the pipe sections and push the spigot end in until the reference mark on the spigot end is flush with the end of the bell. Use a bar and block of wood to push pipe home.
- d) Field cut pipe shall be square cut and beveled to insure proper assembly. Use a factory finished beveled end as a guide to produce an equivalent angle and length of taper.

3) Asbestos Cement Transition:

- a) When connecting PVC or Ductile Iron pipe to existing asbestos cement pipe, the transition coupling is to be applied to the rough barrel of the asbestos cement pipe and not to a factory or machined end of the asbestos cement pipe.
- h. A tracing wire of 14 gauge copper shall be installed and taped directly on top of the pipe in a manner that a continuous trace results. Wire is to be wrapped around hydrants, blow offs and corporation stops.

- i. Place underground warning tape directly above all water mains, 18" below finished grade. Tape shall be polyethylene tape with a metallic core, 2 inches in width, with the continuous printed message "Caution Waterline Buried Below." Tape shall be Catalog No. 2 WAT as manufactured by the Seton Name Plate Corp. or approved equal.

C. Installation of Valves, Fittings, and Hydrants:

1. General: Valves, fittings and hydrants shall be set and jointed to the piping system as hereinbefore specified for cleaning, laying and jointing pipe.
2. Valves and Valve Boxes: Cast iron valve boxes shall be firmly supported, centered and plumb over the operating unit of valve. Box cover shall be set flush with the surface of finished pavement or at such other level as may be directed by the Inspector. Valve rod extension with guide shall be required to maintain a distance of 2'-4' from operating nut to top of box. All valves shall be properly restrained.
3. Valve Key Extensions: Valve stem extensions shall be required where the valve-operating nut is installed at a depth greater than four feet (4').
4. Cross Connections: Drainage branches or blow-offs shall not be connected to any sewer, submerged in any stream or installed in any manner which, in the opinion of the Inspector, will constitute a contamination hazard or cross connection.
5. Hydrants:

Connection to Main: Each hydrant shall be restrained and connected to the main with a minimum 6 inch branch, controlled by an independent 6 inch gate or resilient seat valve.

Setting of Hydrants: When hydrants are set, a drainage pit two feet in diameter and two feet below the bowl of the hydrant shall be excavated. Valves: All valves shall be restrained with a hydrant tee.

The pit shall be filled with coarse gravel or #57 clean stone, mixed with coarse sand, to a level of 6 inches above the weephole. No hydrant drainage pit shall be connected to a sewer. The bowls of all hydrants shall be well braced against unexcavated earth with suitable concrete backing, and when directed shall be restrained to the pipe with approved harnessing. All hydrants shall be thoroughly cleaned of dirt or foreign matter before setting.

6. Anchorage of Fittings: As required in Part V, Section 4 of this document, all fittings, i.e., each bend, tee, plug, valve and cap shall be prevented from moving by means of adequate thrust reaction blocking or mechanical restraints; or both.
7. In easements and in undeveloped wooded areas, plastic markers shall be installed every 200 feet, and at all valves and fittings. Markers shall be as manufactured by Carsonite or approved equal. Exceptions are where water lines are installed in "kept" yards where the property owners may object to the placement of these markers. Contractors will be required to properly install the markers per manufacturer's recommendations, parallel to the water line facing roadway, or as additionally directed by the County.

D. Installation of Fabricated Steel Tapping Sleeves:

1. General: Rigorous testing and conditions relating to tapping sleeves, applied to all manufacturers, is standard operating procedure. These conditions are as follows:
 - a. The tapping sleeve shall be tested in place to a minimum of 200 psi, for a minimum of 10 minutes with no loss of pressure.
 - b. If the sleeve fails the 200 psi pressure test, the original failed sleeve shall be replaced with an entirely new sleeve.
 - c. Tapping sleeves 16" and above shall be supported by a concrete pedestal support, as shown in the County's "Standard Details" Section.
2. Rockwell Tapping Sleeve: In addition to the conditions outlined in Section 1 above, the following procedures must be followed by the contractor:
 - a. Clean pipe surface thoroughly, particularly in the area where the gasket will seal. The contractor shall wipe the pipe in the area where the tap is to be made with a 1% chlorine solution prior to installing the sleeve.
 - b. Lubricate pipe and gasket with soap and water.

It is not necessary to lubricate pipe. (See item c. Under no condition should any antifreeze be used.)
 - c. Mount body halves on pipe. Contractor shall ensure gasket is secure in gasket groove.

EDITION 3

ADDENDUM #1

NEW PAGES

TO BE INSERTED INTO

PART V

OF

CHESTERFIELD COUNTY

WATER AND SEWER

SPECIFICATIONS

PLEASE THROW THIS SHEET AWAY WHEN INSERTING NEW PAGES INTO BOOK.

APPROVED MATERIALS AND MANUFACTURERS INTRODUCTION

This document represents a listing of specific manufacturers whose products have been approved for use within Chesterfield County's water and sanitary sewer systems. The listing is divided into four sections. Sections 1 and 2 contain lists by type of material and indicate the approved product of each. Section 3 provides a listing of approved manufacturers followed by their addresses and local suppliers. Section 4 provides detailed materials specifications.

This listing is intended to be used as a reference source for the Utilities Department's employees, contractors and vendors. Materials produced by manufacturers not listed herein are not acceptable for use within the County's systems. Manufacturers interested in submitting products for evaluation and possible approval should communicate their interest to the Chairman of the Product and Design Review Committee, Utilities Department, County of Chesterfield, P.O. Box 608, Chesterfield, Virginia 23832-0009.

It should be noted that in some cases manufacturer approval is on a plant-by-plant basis. The Committee reserves the right to perform a comprehensive plant and product evaluation and testing based on Utilities Department's "Producing Plant/Product Evaluation Procedures", and at the sole option of the department, plant evaluations may be required on an on-going basis for new and existing facilities. The Committee also reserves the right to limit the number of approved manufacturers and products as they deem necessary to control parts inventory and maintenance/ training requirements.

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Watts Regulator Co.	Model 375	2½"	-	6"
	Model 375 DA	4"	-	6"
	Model 475	4"	-	6"
	Model No. 900	3"	-	6"
	Model No. 909	3"	-	10"
	Model No. 009RP	3"	-	3"
	575	3"	-	6"
	MX-RPDA			6"
	RPDA	3"	-	6"
	975	3"	-	8"

V. Casing Spacers

1. Cascade
2. Advance Model SSI
3. PSI Model No. C8G-2
 Model No. C12G-2
4. Power Seal Model No. 4810

W. Lubricants

1. Blue Lube
2. Slikstyx (new product formulation only)

X. Water Sampling Stations

1. GIL # EH101

Y. Valve Key Extensions

1. Chesterfield Model (See Detail in Part II of this manual)

SECTION 2: SANITARY SEWER SYSTEM

A. Pipes

1. Concrete
 - a. Circular Reinforced (ASTM C76)
2. PVC Sanitary Sewer Pipe SDR35 (ASTM D3034 6" - 15")
3. PVC Sanitary Sewer Pipe Envrio-Tite SDR 35 (ASTM F1760 6"-15")
4. PVC Sanitary Sewer Pipe SDR 35 (ASTM F679, 18"-48"), T1 Wall Thickness
5. Perma Loc (21"-36") Series 46 with minimum wall thickness of 17"
6. Ultra Rib (21"-36") with minimum wall thickness of .17"
7. Ductile Iron Pipe Class 52 Minimum or higher classification depending upon design consideration.
(Push-On and Mechanical Joint) (6", 8", 10", 12", 16", 20", 24", 30" & 36")
8. Carlon Vylon H.C. - a.k.a. Lamson Pipe (21"-48") with minimum wall thickness of .17"
9. Ultra-Corr PVC Pipe (24"-36") with minimum wall thickness of .17"

B. Manholes, Precast Concrete (ASTM C478)

1. Hanson Pipe & Products
2. Americast
3. Concrete Specialties, Inc.

C. Frames and Covers

1. Manhole

- | | | |
|----|---|--|
| 2. | Advance Products & Systems, Inc.
P.O. Box 53096
Lafayette, LA 70505-3096 | (318) 233-6116
FAX (318) 232-3860 |
| 3. | PSI Pipeline Seal and Insulator, Inc.
6525 Goforth Street
Houston, TX 77021 | (713) 747-6948
FAX (713) 747-6029 |
| 4. | Power Seal Pipeline Products Corp.
P.O. Box 2014
Wichita Falls, TX 76307 | (817) 767-5566
(800) 800-0932
FAX (817) 732-8378 |

LUBRICANTS

MANUFACTURERS:

- | | | |
|----|---|--|
| 1. | J. C. Whitlam Manufacturing Company
200 West Walnut Street
P.O. Box 380
Wadsworth, Ohio 44282-0380 | (800) 321-8358
(330) 334-2524
FAX (800) 537-0588
FAX (330) 334-3005 |
| 2. | Future Tools, Inc.
13591 Cable Road
Pataskala, Ohio 43062 | (740) 927-7712
FAX (740) 927-9929 |

WATER SAMPLING STATIONS

MANUFACTURERS:

- | | | |
|----|--|----------------|
| 1. | GIL Industries, Inc.
P.O. Box 3501
Pensacola, FL 32505 | (904) 434-3912 |
|----|--|----------------|

VALVE KEY EXTENSIONS

MANUFACTURERS:

- | | | |
|----|--|--------------------------------------|
| 1. | West End Machine and Welding, Inc.
6804 School Avenue
P.O. Box 9444
Richmond, VA 23228
Attn: Dan Heath | (804) 266-9631
FAX (804) 264-0747 |
|----|--|--------------------------------------|

PIPE: PVC SDR-35 (Sizes 18"-48") ASTM F679

MANUFACTURERS:

1. Certainteed Corporation (610) 341-7000
P.O. Box 860 FAX (610) 341-6837
Valley Forge, PA 19482
2. Condux Pipe Systems (507) 387-2284
P.O. Box 789
Mankato, MN 56002
3. J-M Manufacturing Co., Inc. (201) 535-1633
9 Peach Tree Hill Road
Livingston, NJ 07039
4. North American Pipe Corp. (601) 728-2111
200 Park Place FAX (601) 728-3135
Booneville, MS 38829
5. National Pipe & Plastics, Inc. (800) 866-0149
9609 Old Highway 421S FAX (336) 996-1755
Colfax, N. C. 27235

PIPE: ULTRA-RIB PVC (21"-36") ASTM F794

MANUFACTURERS:

1. Extrusion Technologies, Inc. (800) 624-3111
A Division of Uponor
P.O. Box 709
Buckhannon, WV 26201

PIPE: PERMA-LOC, PVC (21"-36") ASTM F794 Series 46

MANUFACTURERS:

1. J-M Manufacturing Co., Inc. (201) 535-1633
9 Peach Tree Hill Road
Livingston, NJ 07039

PIPE: CARLON VYLON H.C. (21"-48") ASTM F794

MANUFACTURERS:

1. Carlon, A Lamson & Sessions Company (216) 831-4000
25701 Science Park Drive (800) 321-1970
Cleveland, OH 44122 FAX (216) 831-3208

20. SPC Marketing (704) 283-8554
P.O. Box 675 FAX (704) 283-8010
Monroe, NC 28111
21. USA - Utility Sales Associates (804) 794-4710
P.O. Box 1168 FAX (804) 794-1397
Midlothian, VA 23113
22. Water Works Supply (804) 730-9050
8338 Old Richfood Road
Mechanicsville, VA 23111
23. National Waterworks (804) 749-8281
2388 Lanier Road FAX (804) 749-4023
Rockville, VA 23146 Toll Free (800) 474-3878
(formerly A & P, WaterPro, and U.S. Filter)

- g. Valve shaft seal shall consist of O-rings or Split-V ring. Where the valve shaft projects through the valve body for the actuator connection, the O-ring or Split-V ring packing seal shall be field replaceable as a part of a removable bronze cartridge, without valve disassembly. Connection to the actuator shall be provided by means of at least 2 bolts for 16" - 24" valves and at least 4 bolts for 30" and larger valves.
- h. When manual actuators are required they shall be amply sized for line conditions. All manual actuators should be traveling nut or wormgear type. All 16" through 24" butterfly valve manual actuators shall be capable of withstanding 300-450 foot pounds of input torque against the open or closed stops. All actuators shall have adjustable mechanical stop limits. The closed position stop may or may not be externally adjustable.
- i. All valves shall be coated with AWWA Standard Epoxy Coatings, in conformance to AWWA Standard C-550, latest revision. All interior ferrous surfaces, including disc, shall be coated a nominal 10 mils thick for long life; and body exterior shall have a minimum 8 mils thickness of hand applied epoxy or 3-5 mils thickness fusion bonded epoxy coating in order to provide protection in shipment and storage, and to afford a superior base for field-applied finish coats.

4. Valve Key Extensions:

- a. The extension shall be one and one half inches (1½") solid core steel with the upper operating nut and bottom coupling welded to the stem.
- b. The 2" square operating nut on top shall be welded to form a complete box with no openings.
- c. 2½" square socket section on bottom shall be tapped on 4 sides for minimum 5/16" N.C. socket head set screws and screws shall be provided.
- d. Valve extensions shall be coated with oil-based enamel or other rust preventative coating.
- e. The operating nut of the valve shall be drilled on opposite sides to allow insertion of the setscrews.
- f. A four and one half inch (4½") diameter steel plate, ¼" thick rock shield, shall be welded to the stem two inches (2") below the bottom of the top operating nut.

5. Tapping Sleeves:

Fabricated Steel:

- a. The body of the tapping sleeve shall be of 3/8" carbon steel, ASTM grade A285.
- b. Flange to be AWWA C207 Class D ANSI, 150 lb. drilling.
- c. The carbon steel body shall have a 12 mil thick coating of fusion-bonded epoxy. Bolts shall be 18-8, Type 304 stainless steel.
- d. Gaskets shall be Grade 60 compounded for use with water, alkalies, mild acids and most hydro-carbon fluids, up to 212° F.

Stainless Steel:

- a. The body of the tapping sleeve shall be of 18-8 type 304 stainless steel.
- b. Branch/flange to be ductile iron, carbon steel or 304 stainless steel, 150 lb. drilling.
- c. MJ Gland shall be permanently affixed to the outlet branch and be 304 stainless steel.
- d. Gaskets shall be Grade 60 compounded for use with water, alkalies, mild acids and most hydro-carbon fluids, up to 212° F.
- e. Clamping hardware (nuts, bolts and washers) shall be 18-8 type 304 stainless steel, with plastic anti-gall washers. Drop-in bolts or welded-on studs are acceptable.

Fabricated Steel with Mechanical Joint Ends

- a. Sleeve body, valve flange, gaskets, hardware and coating to be the same as the fabricated steel tapping sleeve.
- b. The mechanical joint glands to be ASTM-A36 iron or ductile iron.
- c. The gland retaining hardware (nuts, bolts and washers) to be 18-8 type 304 stainless steel.

Cast Iron with Mechanical Joint Ends:

- a. The body and glands of the tapping sleeve shall be of ASTM-126, Class B cast or ductile iron. Sleeve shall be furnished complete with all mechanical joint accessories (bolts, nuts, gaskets and glands), and shall have a bituminous seal coating.
- b. Valve flange, body gaskets and clamping hardware (bolts, nuts and washers) shall be as specified for the fabricated steel tapping sleeve.

Tapping Sleeve Applications

- a. The use of tapping sleeves and valves on the County water system will be considered where it can be shown that installation of a tee and line valve on the existing water main will not be beneficial to the County.
- b. The stainless steel or fabricated steel with mechanical joint ends or cast/ductile iron with mechanical joint ends tapping sleeves may be used for any approved tap on C-900 PVC or ductile iron water main.
- c. The stainless steel or fabricated steel with mechanical joint ends or cast/ductile iron with mechanical joint ends tapping sleeves may be used for all approved taps on asbestos-cement pipe (except 16" size) and for size-one size or one size down taps on all other pipe material.
- d. Due to the non-availability of the mechanical joint tapping sleeve for 16" asbestos-cement pipe, the stainless steel sleeve must be used for taps on this pipe.
- e. The fabricated steel tapping sleeve may be used for approved two (or more) size down taps on C-900 PVC, cast iron or ductile iron water main.
- f. Application Chart:

Taps	Size on Size	Cast Iron, Asbestos Cement, Transite	P.V.C	Ductile Iron
		Stainless Steel	Stainless Steel	Stainless Steel
Type of Sleeve	Stainless Steel	Stainless Steel	Stainless Steel	Stainless Steel
	Mechanical Joint	*Mechanical Joint	Mechanical Joint	Mechanical Joint
			**Fabricated Steel	**Fabricated Steel

* Except on 16" A/C pipe.

** Approved for use on 2 or more downsize taps only.

Certification, Testing and Installation:

- a. All tapping sleeves must be crated for shipment with a signed manufacturer's tag certifying that the sleeve meets Chesterfield County specifications. The County inspector shall turn this tag in to the contract file with the location of installation noted on the tag.
- b. Rigorous testing and conditions relating to tapping sleeves, applied to all manufacturers, is standard operating procedure. These conditions are as follows:
 - 1) The tapping sleeve shall be tested in place to a minimum of 200 psi. It is the contractor's responsibility to order the correct pressure rated tapping sleeve. However, for pre-stressed concrete steel cylinder pipe, taps 12" or less shall be tested to 150 psi and taps larger than 12" shall be tested at 10% above the line pressure of the main being tapped.
 - 2) If the sleeve fails the 200 psi pressure test, the original failed sleeve shall be replaced with an entirely new sleeve.
 - 3) The concrete thrust block shall be poured to also support the tapping sleeve from beneath. The tapping sleeve, valve and tapping machine assembly is to be adequately supported during the tapping operation to prevent movement or rotation of the tapping sleeve.
 - 4) Installation instructions must be followed in strict accordance with the latest County's procedures.

6. Double Check Assembly

- a. Valve Pit:
 - 1) Valve pits shall be of adequate size and readily accessible for inspection, testing, maintenance, and removal of equipment contained therein. They shall be constructed and arranged to properly protect the installed equipment from movement of earth, freezing, and accumulation of water. Poured-in-place or precast concrete, with reinforcement, are appropriate materials for construction of valve pits. Pits constructed of block material are not acceptable. Precast concrete vaults will be as reflected on the standard detail drawings (Part II of this document).

- 2) The vault shall be watertight. The vault shall be coated on the outside face with a mastic or bituminous coating to prevent infiltration.
- 3) The vault will contain positive drainage. A sump with gravity flow is required if water table problem does not exist. Where water table problem exists, a sump pump is required.
- 4) Pipe penetrations shall be sealed with "Link-seals", a waterproof mastic coating or equal. A clearance of 1"-3" shall be provided around the pipe where the fire line enters and exists the pit.
- 5) Vaults greater than 3.0' in depth will have some type of ladder provided for ingress and egress.
- 6) The entrance hatch to the vault will be a JD-2AL 4'-0" x 4'-0" Bilco door, or as manufactured by Elite Fire Protection, Inc., Hydro Tap Service, Inc.; or approved equal.

b. Valving:

- 1) The double check valve assembly shall be a Watts No. 709 or equal surrounded by an OS&Y gate valve on both the inlet and outlet side of the assembly.
- 2) The Fire Department connection may or may not be located in the vault. The use of post indicating valves, location of the Fire Department connection, and other related fire questions will be addressed by the Fire Department.
- 3) Pipe stands such as poured concrete or fabricated metal shall be provided to support the entire assembly. Metal Pipe stands shall be galvanized or be coated with an acceptable paint to prevent rust. Concrete block or brick is not an acceptable support material.

7. Fire Hydrants:

- a. Fire hydrants shall be manufactured in full compliance with this specification and shall also comply with the American Water Works Association Fire Hydrant Specification C-502, latest revision and the following:
 - 1) Type: Compression - Dry Standpipe: Valve shall open against and close with the pressure. The design shall be such that all internal operating parts can be removed through the standpipe and main valve rod extended without excavating.

- 2) Size: Internal valve diameter shall be a minimum 4½".
- 3) Inlet Size and Type: 6" mechanical joint end with accessories.
- 4) Hose Nozzles: Each hydrant shall be equipped with two 2½" I.D. hose nozzles with National Standard threads, one quarter turn bayonet lock or threaded in with O-ring seal and suitable locking arrangement.
- 5) Steamer Nozzle: Each hydrant shall be equipped with one 4½" Steamer Nozzle having National Standard Threads, one quarter turn bayonet lock, or threaded in with O-ring seal and suitable locking arrangement.
- 6) Direction of Open: Left, counter-clockwise.
- 7) Size and Shape of Operating Nut and Cap Nuts: to be 1½" point to flat pentagon. Each hydrant shall be equipped with a weather cap or weather seal.
- 8) Seal Plate: The hydrant shall be so constructed that a moisture-proof lubricant chamber is provided which encloses the operating threads, thereby automatically lubricating the threads each time the hydrant is operated. The lubricant chamber shall be enclosed with at least three O-rings. The two lower O-rings will serve as pressure seals; the third O-ring will serve as a combined dirt and moisture seal to prevent foreign matter from entering the lubricant chamber. The hydrant shall be equipped with either an anti-friction washer or bronze bushing to reduce operating torque. The bonnet will be secured to the hydrant using bolts and nuts.
- 9) Standpipe - Groundline Safety Construction: The standpipe sections shall be connected at the groundline by a two part, bolted safety flange or breakable lugs. The main valve rod sections shall be connected at the groundline by a frangible coupling. The standpipe and groundline safety construction shall be such that the hydrant nozzles can be rotated to any desired position without disassembling and removing the top operating components and the top section of the standpipe. The minimum inside diameter of the standpipe shall be 6".

- 10) Main Valve, Rod Assembly: The main valve rod assembly shall be so constructed to allow removal of all operating parts through the standpipe regardless of depth of bury, using a removal wrench which does not extend below the groundline of the hydrant. The main valve seat ring shall be bronze and its assembly into the hydrant shall involve bronze to bronze thread engagement, and the valve assembly pressure seals shall be obtained without the employment of torque compressed gaskets. The design of the main valve rod shall be such that the operating threads at the top of the rod and the valve assembly threads at the bottom of the rod are isolated from contact with water in the standpipe or in the hydrant inlet shoe.
- 11) Drain Valve: The operation of the drain mechanism shall be correlated with the operation of the main valve and shall involve a momentary flushing of the drain ports each time the hydrant is opened. The drain ports shall be fully closed when the hydrant valve is more than $2\frac{1}{2}$ turns open and the drainage channel in the bronze valve seat ring shall connect to two or more outlet drain ports. No springs may be employed in the hydrant valve or drain valve mechanism.
- 12) Depth of Bury: Hydrant shall be suitable for installation in trenches $4\frac{1}{2}$ ' deep, unless otherwise specified.
- 13) Painting Instruction: Two prime coats and one aluminum finish coat shall be used, unless otherwise specified. Exposed area of fire hydrant shall receive one field coat of aluminum after installation. The wetted surface of the hydrant shoe shall be epoxy coated to prevent corrosion of the waterway.
- 14) Pressure Rating: Test pressure 300 psi, working pressure 150 psi.
 - b. If the standard hydrant provided by a manufacturer does not fully comply with these specifications, but compliance can be attained by providing optional features, then each hydrant must be permanently marked to indicate the option or options that have been provided. The method of marking hydrants to indicate that options are included must be approved by the Product and Design Review Committee.

8. Check Valves:

Check valves shall be of the horizontal swing type; iron body bronze mounted, equipped with weighted lever or spring as specified or shown on the plans.

9. Water Service Assembly for 5/8" Water Meters: All materials for the installation of water services shall be as follows or approved equal:

- a. Water meter boxes (for use with all 5/8" and 1" meters) shall be as manufactured by Mid-States Plastics, Inc. for high density polyethylene boxes or approved equal.

The meter box shall be 24" high with a cover and reader lid. The box shall have a 1¼" anti-settling flange on the bottom edge. It shall be made of hi-density polyethylene plastic of one piece, molded construction for durability with dimensions as shown on the standard detail in Part II of this document. The box must have solid walls with an average thickness of no less than .550" and have been tested to withstand a 15,000 lb. vertical load freestanding. The inside color shall be white to reflect light for ease of meter reading and the outside shall be black to protect against UV degradation during prolonged exposure to sunlight i.e. during outside storage. All edges shall be clean and smooth for safety during handling.

The meter box cover shall be one-piece, with reader lid made of cast iron for 5/8" and ductile iron for 1" boxes. One piece cover designed to fit the corresponding opening in the meter box frame and have a square treadplate surface design. "WATER METER" shall be on the reader lid.

The lid dimensions shall be: for 5/8" box - 15.437" x 10.125" with a minimum weight of 17 lbs. and for 1" box - 11.125" x 18" with a minimum weight of 21.5 lbs. It shall have a minimum thickness of .25", with tensile strength 65,000 psi, yield strength 45,000 psi. The castings shall be made of ductile iron and conform to ASTM A536-80.

- b. Water meter boxes used in traveled areas shall be made of cast iron as manufactured by Capitol Foundry or approved equal. Material shall consist of gray iron per ASTM A-48 (latest revision) Class 30.

- c. Meter yokes/setters shall be 3/4" for 5/8" meter with saddle nut. Inlet and outlet sides of meter setter shall be equipped with 3/4" flare or compression copper coupling.
- d. 3/4" Corporation stop with corporation cock thread inlet shall be those as specified in the approved materials list shown in Section 1 entitled Water System.
- e. Pipe shall be 3/4" type "K" copper domestic manufactured.
- f. Tail piece on yoke shall be 3/4" type "K" copper and be long enough to extend 18" outside of meter box.
- g. Service Saddles:
 - 1) All saddle castings must be ductile iron and meet the requirements of ASTM A-536-80, protected with corrosion resistant paint or epoxy coating.
 - 2) All saddles must have a minimum of two (2) 1 1/2" wide (including bolts) stainless steel straps type 304 (18-8) where welds are passivated for resistance to corrosion. Exception: Ford FS202 which has two (2) bolts and a single strap with a minimum width of 3 1/4".
 - 3) Gaskets must be made of Virgin NBR compound.
 - 4) Service saddles are required on all taps made onto PVC pipe.

10. Water Service Setter for 1", 1 1/2" and 2" Water Meters:
All Materials for the installation of water services shall be as follows or approved equal:

- a. The water meter box and cover (for use with all 1" meters) shall be as manufactured by Mid-States Plastics, Inc. for high density polyethylene boxes or approved equal. The boxes shall conform to the specifications as outlined under the "Water Meter Assembly for 5/8" Water Meters" and the dimensions as specified in the standard detail shown in Part II of this documents for 1" meters.

1 1/2" Nominal size pipe, 1.63" outside diameter, .072" wall

2" Nominal size pipe, 2.13" outside diameter, .083" wall

The bypass assembly shall be sized as follows:

1" Meter setter requires minimum 3/4"

1 1/2" Meter setter requires minimum 1 1/4" bypass pipe & valve

2" Meter setter requires minimum 1 1/4" bypass pipe & valve

11. Valve Boxes: All underground valves shall be installed in approved cast iron valve boxes, having suitable base and shaft sections and covers to protect the valve and permit easy access and operation. Box assemblies shall have slip adjustment (two-piece sliding type adjustable valve box).

12. Air Release Valves: All valves shall be designed in accordance with the following standard and/or by the Engineer as required.

- a. Type 1: Small orifice valves shall be either of the kinetic design type, employing only one moving part, a stainless steel float ball or of the stainless steel float and lever type. It shall maintain closed position to prevent the loss of water by positive seating of the float ball against a smoothly ground contact surface of the exhaust orifice.

It shall automatically provide for the escape of air to atmosphere without the loss of water when the float ball moves away from the orifice seat. The body of the valve shall be cast iron and shall be coated to withstand moist environment.

Valve shall have a minimum of a one-inch N.P.T. inlet for 6", 8" and 12" pipe sizes and a two-inch N.P.T. inlet for pipes 16" and larger; and shall have a minimum of a 3/32" outlet orifice for 6", 8" and 12" pipe sizes and a 3/16" outlet orifice with 16" and larger pipes.

Valve shall be suitable for 150 psi working pressure.

- b. Type 2: Shall be a combination, dual unit valve, combining one (1) small and one (1) large unit, both employing the kinetic operating principal or of the stainless steel and lever type. For the Kinetic type, the only moving parts shall be two (2) stainless steel balls (one for each unit) which will remain in the respective throat areas when discharging air without blowing shut or collapsing the float ball(s).

In the closed position, resulting from water filled line, the valve shall prevent leakage.

The large orifice seat shall be of composition material and replaceable.

The body of the valve shall be cast iron and shall be coated to withstand moist environment.

Valve size shall be six (6) inch with 3/8" orifice for small unit and shall be suitable for 150 psi working pressure.

13. Manholes:

- a. Gate Valve Manhole and Air Release Manhole: Shall be concrete, ASTM C-478 and diameters shall be as shown on plans and meets the specifications as described in Part V, Section B of this document entitled "Sanitary Sewer Systems".

14. Joint Restraint Systems:

When gray cast or ductile iron fittings are used with AWWA C900 PVC pipe in sizes up to 12 inches or Ductile Iron Pipe in sizes up to 48 inches and the engineer has determined thrust blocking will not provide adequate thrust restraint, an approved Mechanical Joint Restraint System can be installed.

Under normal conditions, the approved method of restraint shall be concrete thrust blocking per County standard details for dead-ends (cul-de-sacs, etc.) ; and horizontal bends, reducers, tees and crosses; and a Mechanical Joint Restraint System for vertical bends, all valves, and carrier pipe thru casings. Mechanical Joint Restraint Systems must be used in certain other approved conditions or special applications (i.e., poor soils) in Chesterfield County's Public Water System, as shown in the following table:

15. Markers:

- a. All markers shall have one of the applicable decal description to reflect the following:
 - 1) Upper decal, white and blue 2 7/8" x 11" standard, worded "CAUTION WATER PIPELINE".
 - or
 - 2) Upper decal, white and blue 2 7/8" x 11" standard, worded "CAUTION WATER VALVE".
- b. In addition, the lower decal shall contain the following:
 - 1) Lower decal, white and blue 2 7/8" x 1 3/4" standard, worded "MISS UTILITY - 1-800-552-7001, CHESTERFIELD UTILITIES".
- c. Total height shall be 66".
- d. Basic marker shall be white in color.

16. Flushing Hydrants - (Chesterfield Model): Flushing hydrants shall be manufactured in full compliance with the following specifications and shall also comply with AWWA's latest specifications on flushing hydrants:

- a. The flushing hydrant shall offer a 360-degree directional discharge and shall have easy above ground accessibility at all times. It shall be capable of being locked and shall be freeze-proof. It shall be equipped with National Standard fire thread connections and a breakaway union for high traffic areas.
- b. It shall be of size 2".
- c. The hydrant barrel shall be 2" iron pipe. The exterior shall be painted with approved coating for durability. The overall length of hydrants can vary according to the depth of water systems.
- d. The barrel and the standpipe shall be joined with a breakable malleable union. A brass hose connection, 2 1/2" NSFT with attached cap and chain, shall be provided for convenience in flushing.

- e. The body valve shall have bronze body with automatic weep, such that when the valve is in OFF position the hydrant barrel shall automatically drain. The valve stem shall be above ground and shall be lockable to prevent tampering. Its operating device shall be of key type design, with permanent attachment to the valve stem.

17. Cast Couplings:

Center Sleeve: Made of ductile iron, Spec ASTM-A536, and coated with an enamel shop coat, sized to accommodate all AWWA pipes of the same nominal size. The center sleeve length of long barrel (sleeve)_couplings shall be a minimum of 10".

End Ring: Made of ductile iron Spec ASTM-A536, and color coded with an enamel shop coat to easily identify its use on various types of pipe.

Gaskets: SBR rubber compound, Grade 30 per Spec ASTM D-2000 for normal water service and an extended shelf life.

Bolts: High strength low alloy steel bolts with heavy hex nuts, per AWWA C-111.

18. Casing Spacers:

Casing Spacers shall be bolt on style with a shell made in two sections of heavy T-304 stainless steel. Connecting flanges shall be ribbed for extra strength. The shell shall be lined with a PVC liner .090" thick with 85-90 durometer or neoprene rubber. All nuts and bolts are to be 18-8 stainless steel. Runners shall be made of ultra high molecular weight polymer (UHMW) or glass reinforced plaster. Runners shall be supported by risers made of heavy T-304 stainless steel or 10 gauge welded steel. The supports shall be mig welded to the shell and all welds shall be passivated or 3/8" diameter stud welded to band and locked with a locking fastener. The height of the supports and runners combined shall be sufficient to keep the carrier pipe at least .75" from the casing pipe wall at all times.

Connectors shall be Kor-N-Seal as manufactured by National Pollution Control Systems, Inc. or approved equal.

- e. Manhole steps shall be corrosion-resistant and shall be one-half inch grade 60 steel reinforcing rod encapsulated in a copolymer polypropylene. The steps shall conform with ASTM C478 paragraph 11 and to the dimensions shown on the Standard Details.
- f. Manhole frames and covers shall be molded of gray cast iron conforming to ASTM A48, Class 30. Castings shall not be coated. Seating surfaces between frame and cover shall be machined. The dimensions and weights shall conform to the requirements shown on the Standard Details.
- g. Sealant for manhole frames shall be a one-component polyurethane sealant similar to Sika "Sikaflex" type 430.
- h. Sealant for flexible pipe connections shall be a two-component polysulfide sealant similar to Sika "Sikaflex" type 412 with primer type 419.
- i. All manholes shall be watertight.

3. Sewage Air/Vacuum Break Valves without Bias Mechanism - All valves shall be designed in accordance with the following standard and/or by the Engineer as required:

The Sewage Air Release and Vacuum Break Valve shall consist of a compact tubular all stainless steel fabricated body, hollow direct acting float and solid large orifice float in H.D.P.E. - stainless steel nozzle and woven dirt inhibitor screen, nitrile rubber seals and natural rubber seat.

The valve shall have an integral "Anti-Surge" Orifice mechanism which shall operate automatically to limit transient pressure rise or shock induced by closure to less than 1.5x valve rated working pressure.

The intake orifice area shall be equal to the nominal size of the valve i.e., a 6" valve shall have a 6" intake orifice.

Large orifice sealing shall be effected by the flat face of the control float seating against a nitrile rubber 'O' ring housed in a dovetail groove circumferentially surrounding the orifice.